---Index to CONTENTS, September, 1933---

The Index for the year 1933 will appear in the December issue

Buildings, Public
A New England Town Hall Which Fits Its Surroundings 51

City and Regional Planning and Zoning
A Chart Which Tells Its Own Story..... 44
Breweries and Distilleries Become a Zoning Problem 62
"Greater Paris" 63
Why the City of Medium Size Will Be the City of the Future..... 66
Land Economics School Established..... 68
Zoning and Planning Notes..... 85

City Manager Government
Recent City Manager Appointments..... 67

Conventions
When and Where..... 87

Finance
Revenue Bonds for Sewerage and Water Supply 61
The Municipal Bond Market..... 79

Fire Prevention and Control
Aids for Fire Prevention Week..... 17

Forestry
Why the Street Trees of Tokyo Excite the Admiration of Visitors..... 59

Forward Steps
Items Contributed by Officials..... 63

Housing
Housing Projects Approved for Federal Aid 73

Legal Decisions
The City's Legal Rights and Duties..... 81

Motor Equipment
Macon's Motorcycle Police Perform Many Services 65

News and Illustrations
Hints for Officials..... 89

Outdoor Lighting
The Illumination of Interurban Arteries.. 95
Increased Illumination Secured by the City of St. Paul..... 97

Parks and Recreation
Park and Playground Development—A Present Opportunity 58
Citizens and Civic Groups Cooperate in Planting City Boulevards..... 63
Profitable Use of Present Opportunities for Park Improvement 64

Police and Crime
International World Police Organized..... 17
The Real Source of Our Crime Problem... 62
Macon's Motorcycle Police Perform Many Services 65

Power Plants
Electricity Supplied at a Good Profit..... 56

Publications
Book and Pamphlet Notices..... 83

Public Utilities
Municipal Utilities and the Blue Eagle... 5

Public Works
Officials of Public Works Administration.. 5
State Engineers for the Public Works Administration 5
More Than One-Third of the $3,300,000,000 Public Works Fund Allotted..... 5
Municipal Utilities and the Blue Eagle... 5
Officers and Board of Governors of International Association of Public Works Officials 7

Information of importance to municipalities regarding procedure and personnel of the

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS

will be found on pages 5, 68, 71, 73, 75, 77, and 79 of this issue.

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No. 9

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In THE MUNICIPAL INDEX (the annual reference volume of data and condensed catalogs published by the American City Magazine Corporation) readers will find much material, including lists, and articles on a wide variety of municipal and civic subjects, not published in the monthly issues of the magazine.

K.I.R.A.—Kalamazoo's Working Model of N.I.R.A. 50
The Answer of the Water-Works Industry to Criticisms of the National Industrial Act 68
How to Apply for Federal Aid for Public Works 71
New Appointments to the State and Regional Advisory Boards..... 75
Tennessee Valley Authority Project..... 77
Regional Public Works Inspectors Appointed 79
Public Works Conference..... 93

Schools
Help for Teachers and Schools from Federal Relief Funds..... 85

Sewers and Sewage Disposal
Catch-Basin Cleaning 13
Sewage Treatment with Coagulant..... 13
From Disposal by Dilution to Separate Sludge Digestion 45
Revenue Bonds for Sewerage and Water Supply 61
Sectional Plate Pipe for Drainage..... 93

Street Cleaning and Snow Removal
Snow Removal in the Winter of 1933-34.. 53
Sweeping the Streets of A Century of Progress Exposition 93

Streets and Highways
Montana Counties Use Auto License Fees for Roads 11
The Dole or Highway Work..... 11
Port Jervis Builds Through Highway..... 11
Street Oiling in New York State in 1932.. 11
Calcium Chloride as a Binder on Sand-Clay and Gravel Roads..... 41
Sand-Clay Base for a Brick Pavement.... 55
The Safety of Divided Roadways..... 69
Grading Maintenance Made More Accurate 91
Soil Concrete for Low-Cost Roads..... 91
A New Machine for Bituminous Road-Mix Work 91

Traffic
Traffic Police Training School..... 17
Evolution of a Highway Safety Campaign. 17
Traffic Control and Facilitation..... 69

Unemployment Relief
The Dole or Highway Work..... 11
K.I.R.A.—Kalamazoo's Working Model of N.I.R.A. 50

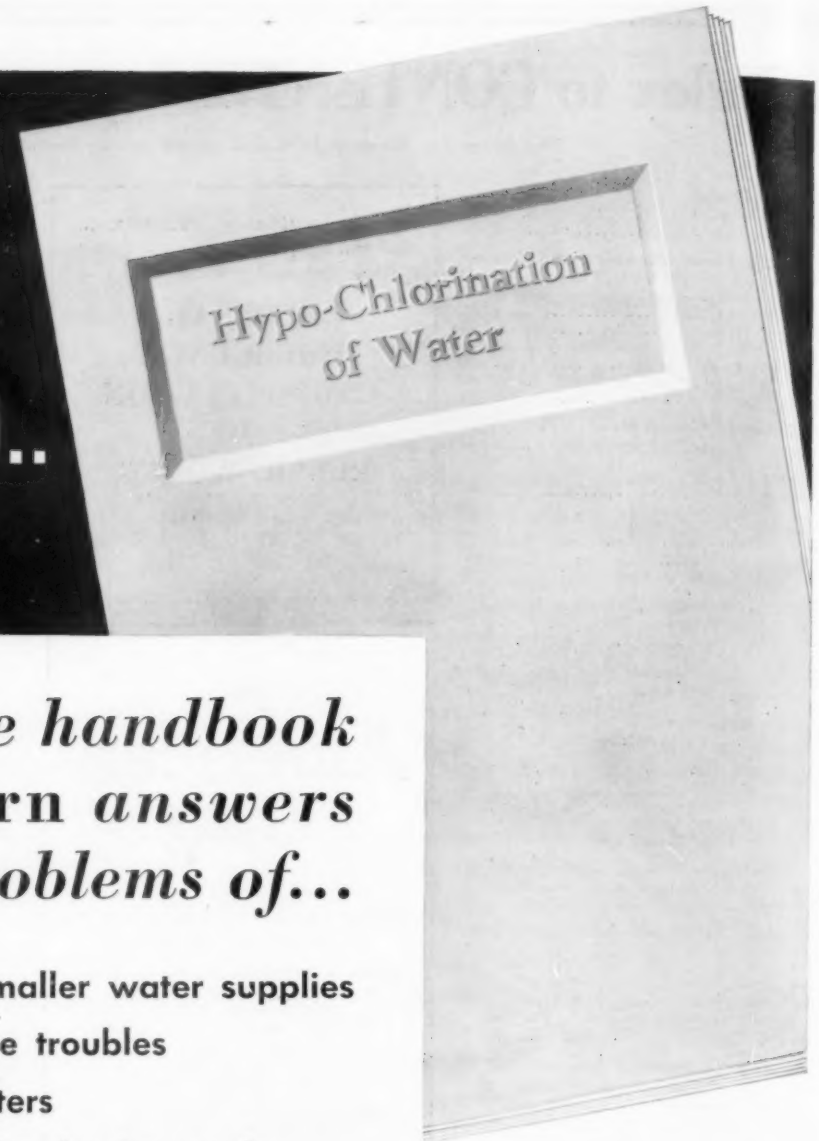
Waste Collection and Disposal
In Various Cities..... 15
Garbage and Rubbish Disposal in Minneapolis, Minn. 57

Water Supply and Water Works
Meters Check Losses..... 9
History of Water Supply..... 9
A Four-Million-Gallon Ornamental Storage Tank 39
Solutions of the Problems of Rate Making for Water Service..... 47
The Effect of Metering on Water Consumption and Water Costs..... 52
Elevated Steel Water Tank Houses Complete Aeration System..... 54
Revenue Bonds for Sewerage and Water Supply 61
The Answer of the Water-Works Industry to Criticisms of the National Industrial Recovery Act 68
An Unusual Elevated Water Storage Tank. 79
Variable Speed Control of Chemical Pumps 89
A New Rate of Flow Controller..... 89

See pages 19, 83, 85 for notices of catalogs and publications on municipal and civic subjects

For Index to Advertisements see page 102

JUST PUBLISHED..



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Public Works—Blue Eagle

Officials of Public Works Administration

SECRETARY of the Interior Harold L. Ickes, during the few weeks since he became Public Works Administrator, has gathered in Washington a group of men outstanding in their professions of engineering, law, architecture and public administration, who are advising and assisting him in the administration of the public works section of the National Industrial Recovery Act. The leading members of this group, as comprised up to August 29, are:

Colonel Henry M. Waite, Deputy Administrator and member of the Special Board of Public Works
Major Philip B. Fleming, Executive Officer
Major Robert W. Crawford, Executive Assistant to the Deputy Administrator
Colonel E. W. Clark, Executive Assistant to the Deputy Administrator
Henry T. Hunt, General Counsel, Legal Division
Fred E. Schnepfe, Director of Federal Projects
Robert D. Kohn, Director of Housing
Lloyd H. Landau, General Solicitor
Clarence McDonough, Director of Engineering
Lewis P. Mansfield, Finance Director
George H. Parker, Chief Accountant
Emil Hurja, Administrative Assistant to the Administrator

Announcement has also been made of the appointment of Paul V. Betters, of Chicago, Executive Secretary of the United States Conference of Mayors, as liaison officer for the Federal Emergency Administration of Public Works with municipalities.

State Engineers for the Public Works Administration

A LIST of State Engineers appointed by the Federal Emergency Administration of Public Works was made public on August 29, 1933. The State Engineers occupy an important place in the Administration's decentralized organization. They are the Administrator's technical representatives in the field who in the first instance pass on applications for public works loans. They also serve as executive officers of the State Advisory Boards.

The complete list follows, with the exception of Alabama, for which appointment has not yet been announced:

ARIZONA-NEW MEXICO—Howard S. Reed, Phoenix
ARKANSAS—Alex Allaire, New P. O. Bldg., Little Rock
CALIFORNIA—Frank E. Trask, State Bldg., Los Angeles
COLORADO—George M. Bull, 229 Custom House, Denver
CONNECTICUT-RHODE ISLAND—Leslie A. Hoffman, Hotel Stratfield, Bridgeport
DELAWARE—Charles H. Fleming, State House, Dover
FLORIDA—James E. Cotton, Tallahassee
GEORGIA—J. Houston Johnston, 722 Citizens and Southern Bank Bldg., Atlanta
IDAHO—Ivan C. Crawford, State House, Boise
ILLINOIS—Joshua D'Esposito, U. S. Court House, Chicago
INDIANA—Albert H. Hinkle, 401-D, Federal Bldg., Indianapolis
IOWA—P. Frank Hopkins, State House, Des Moines
KANSAS—Robert J. Paulette, Topeka
KENTUCKY—Robert V. L. Wright, 267 Federal Bldg., Louisville
LOUISIANA—Orloff Henry, 714 Masonic Temple, New Orleans
MAINE—George M. Williamson, Portland
MARYLAND—Abel Wolman, 1245 Baltimore Trust Company Bldg., Baltimore
MASSACHUSETTS—Charles R. Gow, 307 State House, Boston
MICHIGAN—Mortimer E. Cooley, 10 Fisher Bldg., Detroit
MINNESOTA—William N. Carey, 1246 University Ave., St. Paul
MISSISSIPPI—George H. Wells, 241 Edwards Hotel, Jackson
MISSOURI—Hugh Miller, Buder Bldg., St. Louis
MONTANA—D. A. McKinnon, 219 Federal Bldg., Helena
NEBRASKA—Albert C. Arend, 420 Federal Bldg., Omaha
NEVADA with UTAH
NEW HAMPSHIRE-VERMONT—Harold L. Lockwood, State House, Concord
NEW JERSEY—Cornelius C. Vermuele, Jr., Industrial Bldg., 1060 Broad St., Newark
NEW MEXICO with ARIZONA
NEW YORK—Arthur S. Tuttle, Capitol, Albany
NORTH CAROLINA—Herman G. Baity, Chapel Hill
NORTH DAKOTA-SOUTH DAKOTA—Harry C. Knudson, Federal Bldg., Devils Lake
OHIO—L. A. Boulay, Wyandotte Bldg., 6th floor, Columbus
OKLAHOMA—Philip S. Donnell, Federal Bldg., Oklahoma City
OREGON—Claude C. Hockley, Federal Bldg., Portland
PENNSYLVANIA—William H. Gravell, Capitol Bldg., Harrisburg
RHODE ISLAND with CONNECTICUT
SOUTH CAROLINA—J. L. M. Irby, Columbia
SOUTH DAKOTA with NORTH DAKOTA
TENNESSEE—Harry S. Berry, Nashville
TEXAS—Robert A. Thompson, Fair Bldg., Fort Worth
UTAH-NEVADA—Richard Ambrose Hart, Federal Bldg., Salt Lake City
VERMONT with NEW HAMPSHIRE
VIRGINIA—James A. Anderson, 337 P. O. Bldg., Richmond
WASHINGTON—Gene Hoffman, Olympia
WEST VIRGINIA—M. Lindsay O'Neale, Charleston
WISCONSIN—James L. Ferebee, Madison
WYOMING—Francis C. Williams, Cheyenne
HAWAII—Stanley L. Scott, Honolulu
ALASKA—Dr. Philip S. Smith, Alaskan Division, Geological Survey
PUERTO RICO—Colonel Francis J. Behr, C.A.C., San Juan

More Than One-Third of the $3,300,000,000 Public Works Funds Allotted

THAT allocations to August 31 total nearly $1,400,000,000 of the $3,300,000,000 fund at the disposal of the Federal Emergency Administration of Public Works, is announced by Public Works Administrator Harold L. Ickes. These allotments include $400,000,000 to the states for rural and urban highways; more than $50,000,000 for other highways, roads and trails; $50,000,000 to the Tennessee Valley Authority; $25,000,000 for subsistence homesteads; about $140,000,000 for work on rivers and harbors and flood control; and varying sums for a long list of Federal projects including reclamation, park service, hospitals, post offices, etc.

The first municipal project to receive a grant and loan is the Tri-Borough Bridge Authority of New York, for the completion of the construction of the bridge connecting the boroughs of Manhattan, Bronx and Queens. For this purpose a Federal loan of $37,000,000 and a grant of $7,200,000 have been made. Five housing projects involving Federal aid to the extent of $9,620,000, as mentioned elsewhere in this issue, have had tentative approval.

On August 24 announcement was made that the Public Works Administration had sent approval contract forms to five municipalities which had applied for loans and grants to construct waterworks systems: Pahokee, Fla.; Clarton, Miss.; Fort Benton, Mont.; Spearfish, S. Dak.; and Newcastle, Wyo.

Allocation of $1,759,500 to the District of Columbia to be spent on the city's sewerage system has also been announced, and $37,500,000 to the Port of New York Authority for a vehicular tunnel under the Hudson River from 38th St., New York, to Weehawken, N. J.

Many other non-Federal projects of a socially useful and economically desirable character now under consideration by the Administration are expected to be approved soon.

Municipal Utilities and the Blue Eagle

THE NRA ruling, as published on this page last month, that municipal governments are not affected (except voluntarily) by codes of maximum hours and minimum wages, has since been modified as to "municipally owned public utilities." In reply to an inquiry as to types of utilities thus affected, the National Recovery Administration writes to THE AMERICAN CITY under date of August 28, 1933:

"The term 'municipally owned public utilities' is restricted to utilities for which charges are made by methods other than taxes. A sewerage system, for example, while termed 'public utility,' is a system that is operated and maintained through a tax system, as a rule, and in some cases on a rental basis in addition to taxes levied. Such a system would not be included in the above interpretation; however, if a state or municipality operating a public utility (whether publicly or privately owned) wants to sign the President's Reemployment Agreement and get the Blue Eagle, it must comply with its provisions."

See Pages 68, 71, and 75

for revised list of state and regional advisers to the Federal Emergency Administration of Public Works, and data as to procedure in applying for Federal funds for public works and housing.

7 out of 10

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and Engineering
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Officers and Board of Governors of International Association of Public Works Officials Meeting in Milwaukee, September 21-23, 1933, for Their Fourteenth Annual Conference

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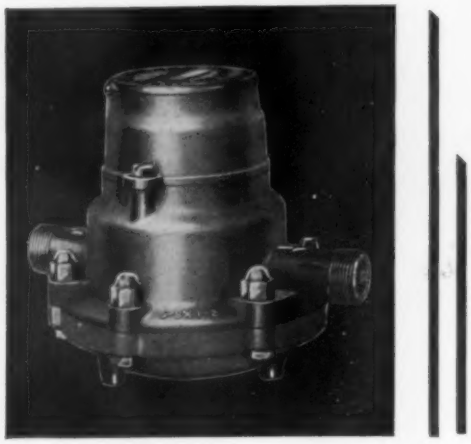

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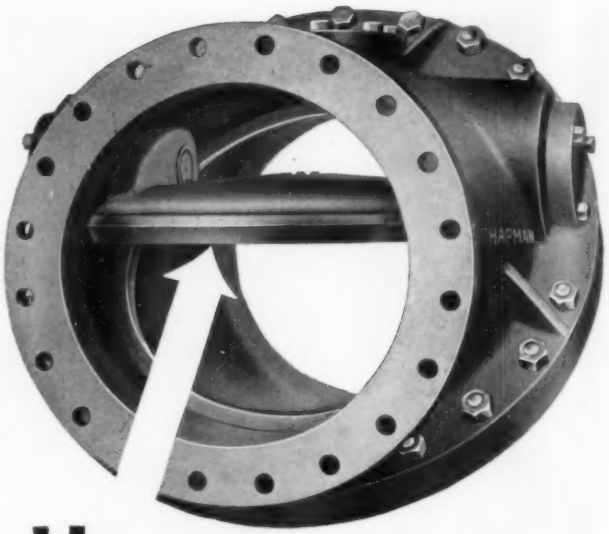

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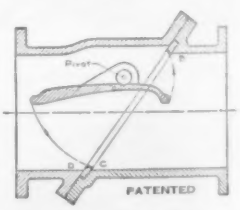


A cushioning effect, obtained by forcing the short flap of the disc against the stream, prevents slamming

THE CHAPMAN VALVE MANUFACTURING CO.
INDIAN ORCHARD, MASSACHUSETTS

Meters Check Losses

Reports on the Services of Water Meters

IMPORTANT STATISTICS

on Services, Meters, Hydrants and Mains of American Water-Works Systems will be found in the forthcoming Municipal Index.

Kansas City, Kans.

IN 1912, the population of Kansas City, Kans., was 84,000, and 52.5 per cent of the domestic services and all of the industrial services were metered. The average daily per capita consumption was 92.2 gallons. In 1920 the population had increased to 101,177, 45.5 per cent of the domestic services and all of the industrial services were metered, and the consumption had increased to 138.3 gallons per capita daily, owing to increased industrial use. In 1930, with a population of 121,857 and all services metered, there was still a slight increase in the per capita daily consumption due to further industrial uses, bringing the total to 144 gallons per capita. In 1932 the population was 122,500, all services were metered, and the consumption had dropped to 107.7 gallons per capita daily, the major portion of this drop being due to a sharp falling off in demand for industrial purposes.—JAMES D. DONOVAN, Manager, Department of Water, Light and Power.

Madisonville, Ky.

IN 1920, when the population of Madisonville was 8,000, there were no meters in the system, and the average daily consumption was 225 gallons per capita. In 1932 the population had increased to 9,000, the system was 100 per cent metered, and the average daily consumption dropped to 105 gallons per capita. The operating expense of the pumping station has been reduced 50 per cent, and the annual power consumption has been reduced approximately $1,500. The annual saving on chlorine is $102, and the miscellaneous expense item has also fallen off 50 per cent. Water is an item of great importance, for Madisonville obtains its supply from surface-fed lakes, and 100 per cent metering has meant a lot toward insuring the city of plenty of water.—HALL ARNOLD, Superintendent, Municipal Light and Water Plant.

Augusta, Maine

PRIOR to 1910 no records are available of the water consumption in Augusta. In 1910 the population was 13,211, 1.1 per cent of the services were metered, and the average daily consumption per capita was 175 gallons. Successive increases in population and in the per cent of services metered has shown a steadily reduced per capita consumption. Metering does not actually save money in Augusta, as we have a gravity supply, but it has conserved water. In 1920 the population was 14,114, 6.8 per cent of the services were metered, and the consumption was 160 gallons per capita daily. The 1930 population was 17,189, 14 per cent of the services were metered, and the per capita consumption had dropped to 128 gallons daily. In 1932, with a population of 17,200 and 15 per cent of the services metered, the average daily consumption had dropped to 119 gallons per capita.—S. S. ANTHONY, Superintendent, Water Department.

Washington Suburban Sanitary District, Md.

THE Washington Suburban Sanitary District, with its office at Hyattsville, Md., was organized in 1918. In 1920, however, the old water systems in the various communities had not yet been consolidated into one large system. These old systems were inadequate, and no fair comparison can be made between the consumption figures of 1920 and those of 1930 and 1932. The communities are now served by one large system. In 1920 the population of the Sanitary District was 32,300, and 10,500 were served with water. Only a very small portion of the services were metered, and the average daily consumption for the population served was 31 gallons per capita. The 1930 population was 60,578 in the District, and 48,000 was served. All services were metered, and the known consumption for the population served was 74 gallons per capita daily. In 1932 the population had increased to 65,000 in the Sanitary District, and 55,000 were served. All the services, which are practically entirely domestic, were metered, and the consumption was 75 gallons per capita daily, for the population served.—ROBERT B. MORSE, Chief Engineer, Washington Suburban Sanitary District.

Danvers, Mass.

IN 1920 the population of Danvers was 11,500, 5 per cent of the domestic services and 50 per cent of the industrial services were metered, and the average daily per capita consumption was 127 gallons. In 1930 the population had increased to 13,000, the domestic services were 60 per cent metered and the industrial services 100 per cent metered, and the average daily consumption had dropped to 101 gallons per capita. It is a difficult matter to determine what cash savings may have been made in the Department due to increased metering, as there are so many factors involved. Our consumption has decreased from 1,462,875 gpd in 1921 to 1,148,362 gpd in 1932. The industrial consumption has decreased, however, the consumption at institutions has increased, and the domestic consumption has decreased. At the same time the revenue has increased, owing to a change in rates. It must also be realized that per capita consumption means nothing unless one knows what is behind the curtains; that is, is it a strictly domestic consumption, or a combined domestic and commercial and institutional consumption? In our particular case, between two industrial plants and three large state institutions, 50 per cent of the entire pumpage is accounted for. Night flow tests on the Danvers system have shown it to be exceptionally free from leakage. In 1921 there was a night flow of 574 gpm, and in 1923 it had increased to 594; but since then it has decreased to 365 in 1927, 481 in 1929, and 277 in 1931. Thus meters and flow tests have brought about the present consumption rate of 1,148,362 gallons in 1932, as compared to 1,539,841 gallons in 1923.—ROGER W. ESTY, Superintendent, Water Department.

HISTORY OF WATER SUPPLY

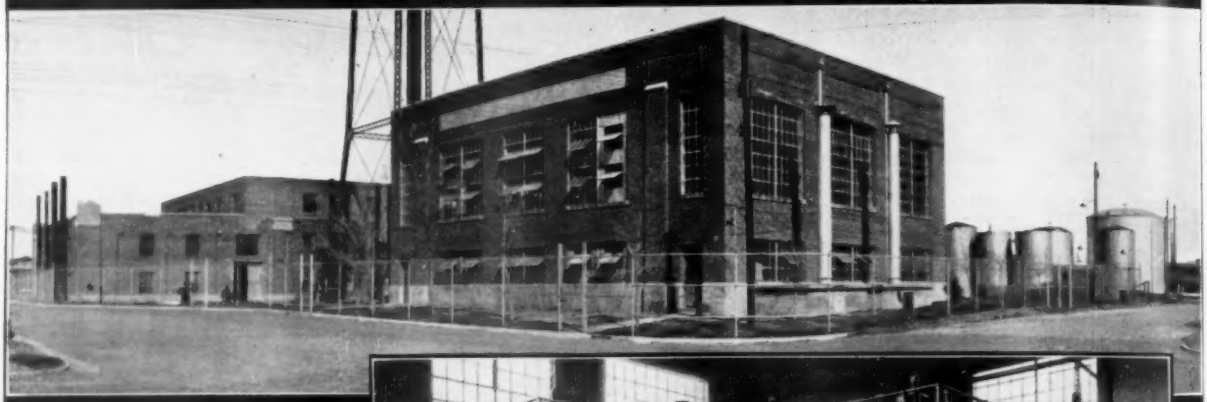
"The Well of Joseph"

THIS WELL at Cairo is one of the most ingenious examples of an ancient public water supply. It is cut into solid rock for a depth of 150 feet. At this level the shaft is enlarged at one side to form a chamber, beneath which is the reservoir. Another shaft connects this reservoir with a bed of gravel where the ground water is tapped. The water is hoisted to the surface in iron pots connected by chains. These are propelled by machinery turned by oxen and horses, who are led to the well bottom by means of a spiral ramp.

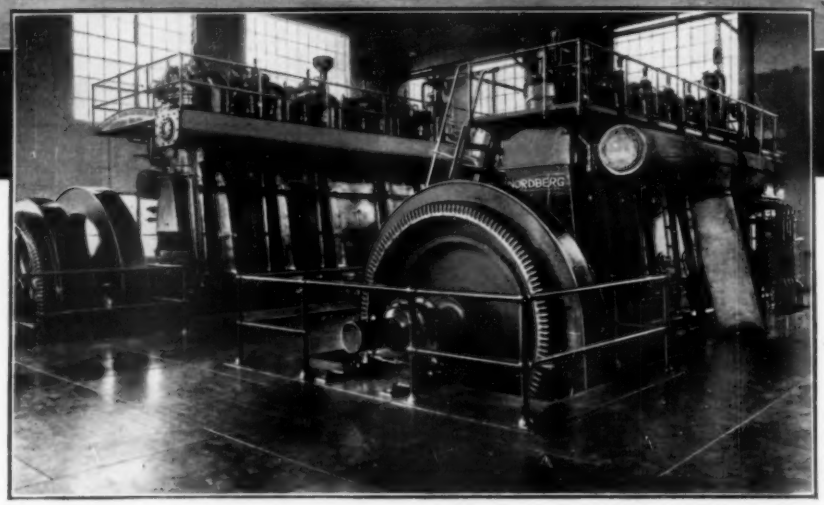
Local legend attributes this well to the famous Old Testament character for whom it is named, but careful research has dated it from the Twelfth Century, A.D. For its time it is an amazing work of engineering, but it is, of course, clumsy and primitive compared to the modern water system that supplies our own city.

NO 6 OF A SERIES OF WATER ADVERTISEMENTS USED IN LOCAL NEWSPAPERS BY THE AMERICAN WATER WORKS & ELECTRIC CO.

NORDBERG DIESELS at Lubbock, Texas



Lubbock's Municipal Diesel Plant. The building in the background houses the smaller units of the original plant



1250 and 1125-K.V.A. Nordberg Diesel generating units, which now serve the City of Lubbock

The municipal power plant at Lubbock, Texas, originally consisted of several small units with additions being made as the load grew. Later, this original plant with its multiplicity of small engines proved inadequate for the city's needs. Its performance was unsatisfactory from the standpoint of economy. To overcome these disadvantages, a new plant was built in 1930 and a 1125-K.V.A. Nordberg Diesel was installed. Last year, another Nordberg unit, but of 1250-K.V.A. size, was placed in service.

If it is larger, more efficient and more dependable units that are wanted, you can depend on Nordberg Diesels—just like Lubbock and other progressive municipalities are doing.

Nordberg Diesels are built in two and four-cycle types, air and mechanical-injection, cross-head and trunk piston construction and in sizes from 150-horsepower up. There is a size and type for your requirements.

Let us send you data on Nordberg Diesels, or better still let a Nordberg Representative discuss your power problem with you.

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KANSAS CITY 2 West 62nd Street
LOS ANGELES Subway Term. Bldg.

Highways and Streets

Construction
Maintenance
Finance

Montana Counties Use Auto License Fees for Roads

THE revenue which Montana counties have had for the construction and maintenance of county roads not on the Federal Aid system has been from the automobile license fund and also from a property tax of 2 to 5 mills for roads, according to R. D. Rader, State Highway Engineer. Each county receives the entire amount paid by automobile owners residing within its limits, after its proportionate share for administration expenses has been deducted. Thus the counties where there are a large number of cars secure more road funds than do counties where fewer automobiles are owned.

The less populous counties have long worried over means to take care of their roads when license funds proved inadequate. They want more of the license money. To give it to them a bill was introduced in the Legislature providing for distribution of the funds equally among the counties. If the bill had passed, the county in which there are 5,000 cars would have received only as much as the county having 500 cars. The bill failed of adoption.

The Dole or Highway Work

THERE are only two possible forms of relief to the unemployed—jobs or dole. Many platitudes have been expressed by as many authors on this subject, and because these platitudes usually express accepted facts or pointed arguments, pro and con, a mere statement of them may be enlightening and may point the way to unavoidable conclusions:

1. Dole does not relieve unemployment.
2. Dole increases unemployment progressively.
3. Dole is cumulative.
4. Dole is destructive of character.
5. Dole destroys the will to work.
6. Dole makes it a risk to accept a job for fear that one may find it difficult to get back on the dole.
7. Dole dollars of tax money reach farther than job dollars, both because of the smallness of the dole as compared with wages, and because dole does not involve profits, materials, etc.
8. Dole relief has been found to involve a minimum overhead expenditure of 25 per cent in those communities where dole is a major problem.

Contrast these generally accepted platitudes with the following axiomatic statements which are as frequently heard:

1. Jobs relieve unemployment.
2. Jobs decrease unemployment progressively.
3. Jobs make more jobs.
4. Jobs preserve and restore character.
5. Jobs are still preferred to dole by the majority of those supported on the dole, but experience indicates that this will become decreasingly true.
6. Work or nothing, should be the answer to every able-bodied man, and when this answer becomes general, those who do not care to work will soon disappear from the community.
7. Ultimately there can be no comparison between the economy of work relief and that of dole relief.
8. There is little or no overhead cost in work relief under present-day conditions.

The general consensus of opinion today is reflected in the following comment: "It would be better to pay men to dig a hole and to pay other men to fill it up again rather than to give unearned dole." Such a proceeding would be wasteful, since it lacks useful accomplishment, and in view of the fact that there is plenty to be done which will produce lasting betterments, as between work relief and dole relief, there can be no question as to which is the better solution from all standpoints including that of the recipient of the relief and that of the taxpayer who foots the bill.

—From a paper by LeRoy C. Smith, Engineer-Manager, Wayne County Road Commission, presented before the Michigan Highway Engineering Conference.

Port Jervis Builds New Through Highway

A DAY of progress dawned on Port Jervis, N. Y., when workers on two ends of Park Avenue, the city's most spectacular work relief project, met in the center of the roadway after nearly nine months of excavation, during which 30,000 yards of rock was removed. The City Council has already authorized advertisement for bids for 10,000 square yards of concrete in place to complete the project. Concreting will begin within two or three weeks, and before winter the city will be equipped with a new western entrance claimed to be comparable in workship and scenic beauty only to the Storm King Highway on the west shore of the Hudson River north of the military academy at West Point.

The stretch of road is literally a shelf dug out of the side of Mount William and connects Main Street with Route 42 leading into Sullivan County. A solid cliff was conquered by workmen on this all-hand labor project, which supplied work to nearly 500 unemployed men during the entire winter and summer.

As a motorist drives over this new road he will be able to view virtually every home in Port Jervis, and may, if he desires, linger at the look-out at the center and high point of the road to view the picture of the Delaware River and Matamoras, Pa., lying beyond, with the Pocono Mountains in the distance.

This is the third of three spectacular relief projects undertaken by Port Jervis in the last two years. The first was a 3½-mile mountain park drive, and the other a new reservoir dam, 1,000 feet long and 50 feet high.

FREDERICK X. CONRAD,
City Engineer.

Street Oiling in New York State in 1932

Name of Municipality	No. of Miles of Streets Oiled in 1932	Kinds of Oil Used	Average Cost per Sq. Yd. Including Materials & Labor
Amsterdam	8.3	Hot and cold application Bituminous T—cold	$ .18
Auburn	6.	Asphaltic cut-back	.05
Batavia	35.	Asphalt with cut-back	.04
Buffalo	1.00	Tarmac	.0787
Cohoes	15.	Standard liquid asphalt	.03
Cortland	1.	Asphaltic	.13
Dunkirk	.50	Socony No. 6	.015
Elmira	28.	Asphaltic cut-back	.12
Glens Falls	....	Colas light oil	....
Gloversville	8.7	Liquid asphalt No. 5 and surface material No. 55	.028
Lackawanna	8.0	Heavy asphaltic	.045
Little Falls	1.5	Tarmac	.045
Lockport	10.	68% asphalt, cut-back	.11
Middletown	....	70% asphaltic	.055
New York			
Brooklyn	51.	Asphalt road oil for cold application	.017
Newburgh	6.29	Tarvia B	.0578
Oneonta	13.2	Tarmac	....
Poughkeepsie	21.01	Liquid asphalt	.027
Rochester	125.	Tarvia retread	.1914
Schenectady	13.5	Defiance road oil	.205 per mile
Tonawanda	4.	Road oil	1,500 total
Watertown	19.26	No. 6 road oil, No. 7 emulsion B	.0496
Endicott	4.	Tarvia B Socony Nos. 4 and 6	.0275–.035
Freeport	10.	60% asphalt	.06
Garden City	13.25	Road oil	.05
Johnson City	13.3	Standard No. 4	.0126
Larchmont	.5	Asphaltic	....
Mamaroneck	6.76	Tarvia B	.05 sq. yd.
Medina	5.	No. 60 Standard oil	....
Rockville Centre	22.39	No. 55 asphaltic	....
Rye	20.	60% asphalt oil	.15
Scarsdale	7.4	Tarvia B and sand	.05
		Asphalt emulsion ⅝" stone	.12
Newark	1,200 ft.	Asphalt	.10

From data gathered by the New York State Bureau of Municipal Information.

Citizen, Your Health!

FIGHT DISEASE AT ITS SOURCE WITH A MODERN SEWAGE DISPOSAL PLANT

Now is the time for every city needing the improvement, to build a modern sewage disposal plant. It's your surest protection against the ravages of water-borne disease, against the disgusting pollution of beautiful streams.

Modern sewage disposal ranks as one of the great scientific advances of the age. It takes raw sewage, alive with dangerous germs, and transforms the solids into useful fertilizers. The liquid is converted into a harmless, sparkling water, often in better condition than when it entered the city water supply.

The process is simple, safe, and economical. There is no odor or unsightliness. A sewage disposal plant can be located any place. Many are located in beautiful public parks.

Every city will have to provide this safety sometime. Why not *now*, when the Federal Government stands ready to help with funds. Its construction at this time will bring work for home labor without burden to home taxpayers.

For centuries sewage from every town and city has been a menacing source of danger and disease. Then modern science . . . chemistry and bacteriology . . . found the solution to the ancient problem of sewage disposal. A modern plant is in reality a huge laboratory where germs are aided in destroying one another to make sewage harmless and inoffensive.

Portland Cement has been of untold assistance to sewage engineers in providing the basic material for waterproof, permanent, low-cost **concrete** for settling tanks and other structures.

For Further Information Write Room 239

PORTLAND CEMENT ASSOCIATION

33 West Grand Avenue

CHICAGO, ILL.

85 to 90% of the money spent on Concrete Construction Goes to Labor

Treatment Conserves Health

SEWERAGE and SEWAGE DISPOSAL

Catch-Basin Cleaning

CATCH-BASIN cleaning is essential because of its direct influence upon the cleanliness of the sewers and the fact that flooded catch-basins often result in serious damage to adjacent property. Newark, N. J., has about 7,000 catch-basins with three different types of heads or inlets: the old type granite head and sill; the concrete gutter inlet with a brick chute leading into the basin; and the cast iron inlet with a large gutter opening and grating. The old type granite head was placed on the corners and at the pockets. The concrete gutter inlet is a reinforced pre-cast slab 6 feet long, having the same width and depth as the curbing. The opening in this curb piece is 30 feet by 6 inches, and a brick chute leads to the basin proper. The cast iron inlet and grating has an opening in the curb 36 inches long and 6 inches high. The grating is 24 inches high and 48 inches long and slopes toward the curb inlet.

The present practice of the Bureau of Sewers is to place the inlet about 3 feet back from the radius curb or at the end of the radius where required, thus catching the storm water from the gutters instead of having this water meet the corner intersection. This prevents water in the gutter where the pedestrian crosses the street and in addition removes the water more quickly.

The catch-basins are 7 feet 6 inches in depth from the top of the curb, 4 feet in diameter and constructed of brick. Traps are built into the bottom of the basins from 2½ feet to 3 feet above the bottom, and measure 14 inches square. The connections from the basins to the main sewer are 12-inch pipe. The basins will hold from 1 to 1¼ cubic yards of material before the trap becomes entirely closed, causing flooding.

Three methods of cleaning are used. Basins are cleaned by the hand method, by the Elgin Auto Eductor, and by the Healey Basin Machine with an orange-peel bucket. The hand gang consists of one shoveler, two top men or laborers, teams and driver, and is equipped with a three-legged wooden derrick with pulley, rope and hook and the necessary wooden pails and other tools. In this method of cleaning, the water is first removed, after which the shoveler descends into the basin and fills the pails, which are then hoisted to the surface. Seven basins make up a day's work of 8 hours for this gang, and the amount of material averages 7 cubic yards. The gang can work about 220 days per year under favorable weather conditions.

The Auto Eductor cleaning detail consists of two laborers attached to the Eductor and a driver or operator. The day's work is the number of basins that can be cleaned in 8 hours. Two men are assigned to the Eductor for the reason that one man goes to the dump with the machine to help with its unloading and cleaning while the other man remains on the job removing sticks and heavy material from the basins to be cleaned. The latter man can usually get the material from five or six basins before the machine returns, hence there is no time lost in the actual operation of the Eductor. On an average, 13 basins were cleaned per day during 302 working days of the last fiscal year. The dumps are about 3½ miles away, so that this traveling cuts down materially the number of basins cleaned per day.

The Healey bucket machine of orange-peel type employs a foreman, one operator, one laborer, one team and one 5-cubic-yard truck on long hauls, or two teams and one 3-cubic-yard truck on short hauls. As in the other methods, 8 hours constitutes the day's work, and an average of 20 basins per day have been cleaned, removing about 19 cubic yards of material.

As a matter of economy, it has been found advisable to send one of the basin-cleaning laborers out with a large pole to examine the basins in order to determine whether it is necessary to clean them at the time when the detail may be in that particular district. When the material in the basin is not sufficient to warrant cleaning, the work is omitted at that time, and the basin is cleaned on the next trip, usually four to six weeks later. This man can inspect about 1,000 basins per week, and the time of equipment and labor saved amply justifies this procedure.

Street cleaners also have definite instructions not to sweep piles of refuse or dirt into the basin or chute. Material when removed from the basin is taken by the teams and trucks to the city dumps, which are in the meadow section, and it is covered with refuse, so that there is no appreciable odor from it. In 1931, a total of 13,440 basins were cleaned and the amount of material removed from these basins was 11,150 cubic yards.

As far as sanitation is concerned in the cleaning of catch-basins, the method of cleaning by hand is gradually being pushed into the background by the machine method. Hand cleaning is being restricted to the basins which are not accessible to the machines. During the last fiscal year only 19 per cent of the total number of basins cleaned were cleaned by hand. In addition to the sanitary feature of machine cleaning, there is also the very important question of cost, which is much greater with hand cleaning.

—From a paper by John S. Flockhart, Assistant Engineer, Bureau of Street Cleaning, Newark, N. J., presented before the International Association of Public Works Officials.

Sewage Treatment with Coagulant

LITTLE interest has been manifested during the past few years in the field of chemical sewage purification. In the light of present-day developments and knowledge of coagulation and sedimentation, the older attempts appear somewhat crude. Lime was usually the coagulant, although alumino ferric, A.B.C., and other similar chemicals were tried. The bulky sludge resulting from the usual dose of one ton of lime per million gallons was pressed in crude hand-operated filter presses and was subsequently turned into the ground. The effluent of some of these plants was remarkably clear as it left the plant but soon became foul. The caustic treatment must have put into solution a considerable amount of organic matter which would decompose when the causticity was neutralized by absorption of carbon dioxide.

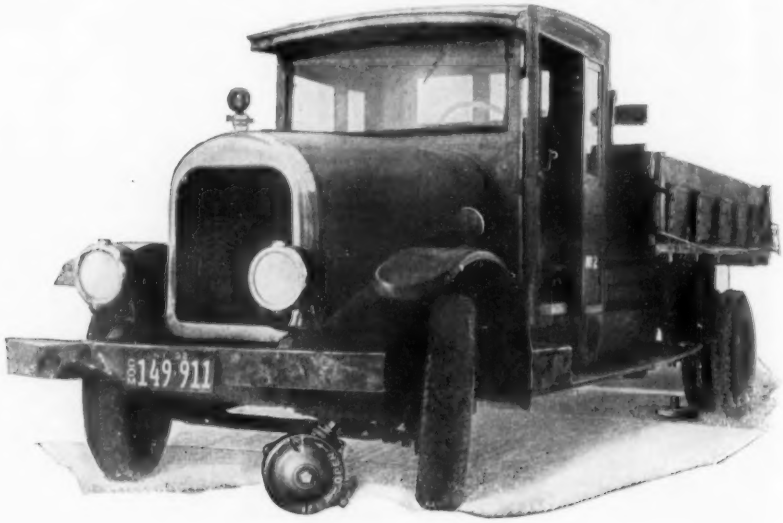
An average sewage will require from 3 to 4 grains of ferric chloride per gallon to completely remove the suspended matter. The use of 4 grains per gallon results in the formation of 376 pounds of ferric hydroxide per million gallons of sewage. To get the greatest benefit from this amount of chemical, the precipitated sludge would have to be disposed of with the sewage solids removed, and we have reason to believe that this amount of iron would seriously interfere with digestion.

A study of chemical sewage purification has shown that a basic reaction would allow the use of the necessary large amount of coagulant without the disadvantage of having to dispose of the resulting sludge. It has been possible to regenerate spent coagulant such as would result from the use of ferric chloride by treating the resulting sludge with chlorine in amounts from 10 to 30 per cent of the weight of dry solids present. The resulting coagulant quickly forms a voluminous floc which settles rapidly, and if organic matter is present, a chloramine substance is formed that has high bactericidal properties. Under certain conditions this cycle can be repeated indefinitely. With sewage, the life of the sludge depends on the amount of organic matter carried down each time by the floc. This is due to the tendency of the organic matter to decrease the specific gravity of the sludge. Experience has shown that the floc becomes too light for rapid settling after about 50 cycles of regeneration.

—From a paper presented by RALPH A. STEVENSON, Research Engineer, Great Western Electro-Chemical Co., before the Fifth Annual Convention of the California Sewage Works Association.

Replace broken fire hydrants *with Kennedy* SAFETOPS

Reg. U. S. Pat. Off.



—to eliminate the major expenses and dangers of future hydrant accidents

THE Kennedy SAFETOP Fire Hydrant is the *only* hydrant which, if accidentally broken, can be repaired for less than $10.00, within half an hour, by one man, and without excavating or shutting off the water supply.

While amply strong to resist ordinary impacts, the Patented Safety Breakable Section of the Kennedy SAFETOP parts cleanly if the hydrant is struck by a smashing collision and it will not cause flooding or likelihood of serious personal injury to the occupants of the colliding vehicle.

One of the most practical methods of securing these exclusive benefits is to install a Kennedy SAFETOP with Adapter when hydrants of other types have been broken by colliding motor trucks or automobiles. The change-over is quick and economical and can be applied to any type of hydrant on the market without disturbing the existing hydrant elbow. If the new Kennedy SAFETOP Fire Hydrant should later be broken in an accident, *the savings in the breakage repair will amount to more than the cost of a new hydrant.*

Write for full information on this opportunity to make important savings in Water Department maintenance expenses.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

Branches and Warehouses in Principal Cities

KENNEDY

VALVES-PIPE FITTINGS-FIRE HYDRANTS

METHODS and COSTS of REFUSE COLLECTION and DISPOSAL

Newport News, Va.

Seven 1½-ton trucks, five 1-ton dump carts and one dump wagon are used for the collection of garbage in Newport News, population 34,700.. The garbage is used to make a fill in an isolated section of the city. For disposal the garbage is dumped over a hill and burned when dry.—H. G. SMITH, Superintendent, Garbage Department.

Spokane, Wash.

Fifteen motor trucks are used by the city of Spokane, population 115,514, up to about June, 1931, on collection of both combustible and non-combustible refuse. At present, owing to the falling-off of business, we are using from ten to twelve trucks. The fleet includes two 2-ton heavy-duty trucks, five 1½-ton heavy-duty trucks and eight 1½-ton light-duty trucks. All refuse is disposed of in the municipal incinerator.—HARLAN COE, Director of Crematory.

Charleston, W. Va.

The city of Charleston, population 60,408, uses seven motor trucks for the collection of garbage. These include four 2-ton, one 3-ton and two 2-ton trucks, which haul to the municipal incinerator.—J. H. TAYLOR, Superintendent of Incineration.

Morgantown, W. Va.

Three motor trucks of 1½ tons capacity each with 8-cubic-yard bodies are used by the city of Morgantown, population 16,186, for the removal of garbage and rubbish, which are collected together and disposed of in the municipal incinerator. A 1½-ton truck is used during six winter months for the collection of ashes.—R. J. JAMISON, Superintendent of Sanitation.

Wellsburg, W. Va.

Garbage and refuse in Wellsburg, population 6,398, is collected by a contractor, who is paid 10 or 15 cents per can for collection, amounting to about $50 per month. The contractor uses one 2-ton motor truck for collection and all garbage and rubbish are disposed of in the municipal Nye odorless incinerator. —HARRY A. DAVIS, City Clerk.

Racine, Wis.

Racine, Wis., population 67,542, uses seven 2½-yard Highway trailers and one 3½-yard Freuhauf trailer for the collection of garbage, in addition to one 2½-ton Diamond truck which is used to haul the trailers in trains of four. The garbage is disposed of in a 120-ton Pittsburgh-Des Moines incinerator.—M. G. GEAREN, Superintendent.

Municipal Dumps, Harbor Rats and Flies

THE present campaign to combat the rat menace brings to the fore the problem of Connecticut cities and towns in the disposal of their garbage, rubbish and ashes, according to an article by Dr. S. H. Osborn, Connecticut State Commissioner of Health. Municipal dumps furnish excellent housing places for rats, and the garbage serves to feed them and keep them thriving. The town dump usually breeds flies, and its many tin cans filled with rainwater breed mosquitoes.

Several years ago the Connecticut State Department of Health made a survey of methods of refuse disposal in 31 cities and towns in Connecticut. Few changes have been made since that time. The survey shows that 23 of these communities require garbage to be separated from ashes and rubbish. The problem of separation at the home is important, for it is closely tied up with the method of disposal. Most communities stipulate that covered metal cans be used to store the garbage, since they can be easily cleaned and are proof against rats and other animals.

Twelve of the 31 communities disposed of garbage by feeding to hogs, 13 by dumping and filling, 4 by a combination of both, 1 by high temperature incineration, and 1 by reduction.

The day of the dump as a means of municipal garbage disposal should be passing by. In a few scattered instances where plenty of earth cover is available and extraordinarily good policing of the dump is carried out, garbage dumps may not be nuisances. Usually, however, they are. Few odors are so objectionable as those arising from the inevitable fires at garbage dumps, and the danger of the rat and the fly, companion pests of the dump, makes the garbage dump objectionable from a health standpoint.

The process of reduction or cooking of garbage generally gives trouble from odors and is not usually adapted to small communities, because of the large initial cost and the necessity of rather highly skilled operation. Burial of garbage in shallow trenches is not used to any extent.

Nuisances can be prevented by the disposal of garbage at piggeries operated under careful management, and the disposal of rubbish and ashes on dumps maintained with proper covering, and attention to prevent dump fires. Increasing density of population, however, accompanied by difficulties in satisfactorily locating piggeries and rubbish dumps, frequently may lead to the adoption of high-temperature incineration for the disposal of mixed garbage and rubbish. This is a sanitary method of disposal and can be operated without nuisance. Its use should spread.

See the 1933 Municipal Index for "A Comparison of Methods for Garbage Disposal Without Odor Nuisance, from the Viewpoint of a Municpal Engineer."

The city of Islip, Long Island, N. Y., has a novel way of taking care that its refuse dump does not become unsightly. They dig sand from a pit with a Caterpillar Thirty-five equipped with a Hyster winch and long drag scraper and and pile up the sand near the tractor. The sand is then sold to the State Highway Department, and the pit is used for a refuse dump. As much as 230 yards of sand a day is moved with this equipment

What "NIRA" Means to Your Fire Alarm System

THE National Industrial Recovery Act is a boon to every municipal fire department in the United States. It offers an opportunity that will not occur again in a life time, to install much needed complete new fire alarm systems or extend existing systems. The Federal government stands ready to make an outright grant to municipalities of 30 per cent of the cost of labor and materials employed on fire alarm projects and loan the remainder over a period of years at a low interest rate.

The government recognizes fire alarm as important as any other improvement. A ruling has been made by Colonel Henry M. Waite, Deputy Administrator under Secretary of the Interior Ickes, to the effect that new fire alarm systems (which include central office apparatus, boxes and outside construction), fire headquarters and other buildings necessary would be provided for under Section 202 (A) which reads as follows:

> *"The Administrator, under the direction of the President, shall prepare a comprehensive program of public works, which shall include among other things the following: (A) Construction, repair, and improvement of public highways and park ways, public buildings, and any publicly owned instrumentalities and facilities."*

There is hardly a city or town in the United States that is adequately equipped in a fire alarm way. Many cities need entirely new fire alarm central offices and engine house recording equipment. Nowhere can be found a sufficient number of fire alarm boxes. Consequently, every city official should take advantage of this opportunity to build up his fire alarm system.

More than 95 per cent of the municipal fire alarm systems of the country were manufactured by The Gamewell Company which has been successfully engaged in the fire alarm business for more than seventy years and is in an excellent position to serve your fire alarm requirements. Our sales engineers are located at convenient points about the country. We should be glad to have one of them call upon you to assist in laying out fire alarm plans and provide estimates of the costs that are required in making application for the Federal loans. This service will not obligate either you or your city in any respect.

THE GAMEWELL COMPANY

NEWTON, MASSACHUSETTS

"A Box A Block"

Fire–Police–Safety

Traffic Police Training School, October 9-21, 1933

ANNOUNCEMENT has just been made by Northwestern University and the Evanston Police Department, in cooperation with the Traffic Committee of the International Association of Chiefs of Police, that a two-weeks course of practical training for police officers in the control of traffic will be held on the Northwestern University campus, Evanston, Ill., October 9 to 21.

Instructors will include police officers and others of national reputation. Full advantage will be taken of the experience of police departments of various cities, and all modern methods which have proved successful will be considered.

This Traffic Police Training School will be under the general direction of Dr. A. R. Hatton, Head of the Department of Political Science of Northwestern University, and Chairman of the Mid-West Conference on Police Problems and Methods. The cooperation of the Evanston Police Department in the undertaking will bring to the students at the School the practical experience of a department which has been using the most modern traffic methods known, and last year won first prize in its class in the National Traffic Safety Contest.

As attendance will be limited to 50 police officers, prompt enrollment should be made. Half of the time will be spent on class work and discussions, and half on actual field experience. The tuition fee will be $10; food and lodging, $2 per day. Since the School immediately follows the annual meeting in Chicago of the National Safety Congress, attendance at the Congress and the School will be possible at a minimum expenditure of railroad fare.

International World Police Organized

ALTHOUGH the International Criminal Police Commission, of Europe, and the International Association of Chiefs of Police, of the United States and Canada, are international in name, neither organization is truly world-wide in its membership or practical operation. For this reason there should be a real field of usefulness for the International World Police, the organization of which took place in Chicago on July 28.

In a radio address on August 25, by Police Commissioner James S. Bolan, of New York, the first president of the new organization, the primary function of the International World Police was emphasized as "closing the net of the forces of law and order around the smartest and the most adroit of all criminals—the international criminal."

"For many years, crimes of international aspect have caused the police forces of the world considerable trouble," said Commissioner Bolan. "Adopting every modern device, including airplanes, radios, transatlantic telephones, and even speed boats, to facilitate operation and escape, international criminals have kept themselves abreast of the modern advances in science. Police organizations, handicapped by old methods and older routine, have found themselves outmaneuvered and out-smarted in their efforts to combat not only the increase in international crime, but the increase in the number of international criminals.

"There are many types of crime, and many types of criminals with which the International World Police will concern itself. A few of these are—

Bad check passers and counterfeiters
Confidence men
Stock and bond frauds and cheats
International gamblers
Violators of international laws on smuggling and the distribution of narcotics
Anarchists and those engaged in advocating the overthrow of organized government
Racketeers
Jewelry thieves
Kidnapers
White slavers

"The charter members of the International World Police comprise the administrative and executive heads of national, state and municipal police forces throughout the world. By agreement among these officials, the International World Police will soon set up and operate two principal Bureaus. One of these Bureaus will be in Washington, to work in close cooperation with the Bureau of Investigation of the Department of Justice, of which H. Edgar Hoover is Director, and this office will serve as the headquarters for the Western Hemisphere. The European headquarters will operate as the principal office of the Eastern Hemisphere."

Evolution of a Highway Safety Campaign

A RESOLUTION adopted by the Eastern Conference of Motor Vehicle Administrators early in 1932 called public attention to the fact that the gasoline service stations of the country potentially were splendid mediums for the dissemination of safety propaganda. Every motorist must visit them. Therefore, anything which would call attention to the disastrous consequences of a bad motor operation, would tend to decrease the effects of such driving.

ONE OF THE POSTERS USED IN THE STREET AND HIGHWAY SAFETY CAMPAIGN

Following this resolution, conferences were held between the Motor Vehicle Administrators, a group of large oil companies, and representatives of the National Bureau of Casualty and Surety Underwriters (1 Park Avenue, New York), one of the leaders of the safety movement in the country. The result of this was an experimental poster campaign in the states of New York, New Jersey, and Pennsylvania under the sponsorship of the Motor Vehicle Commissioners of those states and under the supervision of the National Bureau.

For seven months of the summer and fall a group of the largest oil companies displayed in 4,000 service stations the posters calling attention to common driving errors. These were changed monthly.

When the accident record of 1932 showed a reduction in the number of persons killed and injured, the oil companies received their share of credit. Despite adverse business conditions, it was decided to extend the campaign in 1933, with the result that 10,000 service stations in 14 states and the District of Columbia are today carrying striking colored posters of common traffic law violations. There will be seven of them in this series, the last to appear in October. This 1933 campaign is again under the sponsorship of Motor Vehicle Administrators and the large oil companies. Already, with business conditions improving, it is planned to extend the work to all the states in 1934. The companies allied this year are: Colonial Beacon Oil Co., Inc., Gulf Refining Co., Standard Oil Co. of Louisiana, Standard Oil Co. of New Jersey, Standard Oil Co. of New York, Standard Oil Co. of Pennsylvania, The Texas Co., and the Warner-Quinlan Co.

The Governors of 34 states have proclaimed September as a safety month. It is aimed chiefly at automobile driving, with the design of checking the late summer increase in accidents. The six-color poster for September, here reproduced, fits in with the work of the Governors. The police of a number of cities have obtained supplies of this or previous posters, which have been placed in conspicuous places on the streets. Traffic courts in New York, Baltimore and other cities are displaying them in their court rooms. Institutions like the Boston Public Library have likewise posted them in their branches. In consequence, millions of persons monthly have been impressed with the fact that the safety of the nation is up to them.

Aids for Fire Prevention Week

The "sticker" reproduced above, and other fire prevention material, can be secured from The National Board of Fire Underwriters, 85 John Street, New York.

. . . THIS PROTECTION CASE GUARDS MATHEWS HYDRANTS FROM SIX COSTLY DANGERS

1. It prevents frozen ground from heaving the hydrant, breaking joints, and starting leaks.

2. It doubles the resistance to traffic accidents. A full-strength barrel is supported by a sand-spun case.

3. It permits the complete barrel to be lifted from the ground. Every working part, including valve seats, becomes visible and accessible.

4. Broken hydrants can be repaired without digging. Simply unscrew the damaged barrel and replace it.

5. Nozzle levels can be raised to accommodate grade changes without disturbing mains or uprooting hydrants—just by inserting a longer Mathews barrel.

6. Only the Mathews principle of design permits *lowering* of the nozzles without digging up the entire hydrant. With Mathews Hydrants you simply cut off the Protection Case and insert a shorter barrel.

These points will be fully explained if you drop a note to R. D. Wood & Co.

"SAND-SPUN" PIPE

NO BETTER PIPE THAN "SAND-SPUN" IS MADE. A PRODUCT FUNDAMENTALLY DIFFERENT FROM PIT-CAST PIPE. NO ANNEALING IS NECESSARY... 16 ft. lengths furnished in all sizes 4 inches to 36 inches inclusive. 20 ft. lengths also furnished in sizes 12 inches to 30 inches inclusive... We are prepared to ship by water, rail or truck.

R·D·WOOD & CO · 400 CHESTNUT STREET PHILADELPHIA

ESTABLISHED IN 1803

Mention THE AMERICAN CITY—it helps.

SEPTEMBER, 1933

Vol. XLVIII, No. 9

The American City

470 Fourth Avenue
New York

35 Cents, $2 a Year

A Four-Million-Gallon Ornamental Storage Tank

Sheboygan, Wis., Builds Largest Municipal Tank

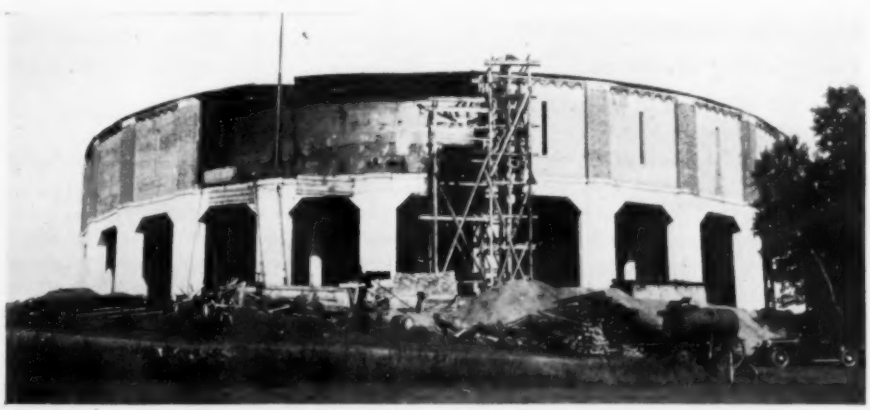
By THEODORE REED KENDALL
Engineering Editor,
The American City

FINANCING the project entirely from the sale of $200,000 of water-works bonds, the city of Sheboygan, Wis., has recently completed and placed in service what is believed to be the largest elevated steel water tank in municipal service in this country. It is located almost directly west of the center of population of the city, and 2½ miles from the shore of Lake Michigan, in a 2½-acre plot owned by the city in the middle of the Taylor Hill reservation, which belongs to the county. The entire tank is encased in a brick structure, so that it makes a truly ornamental addition to the landscape of the community.

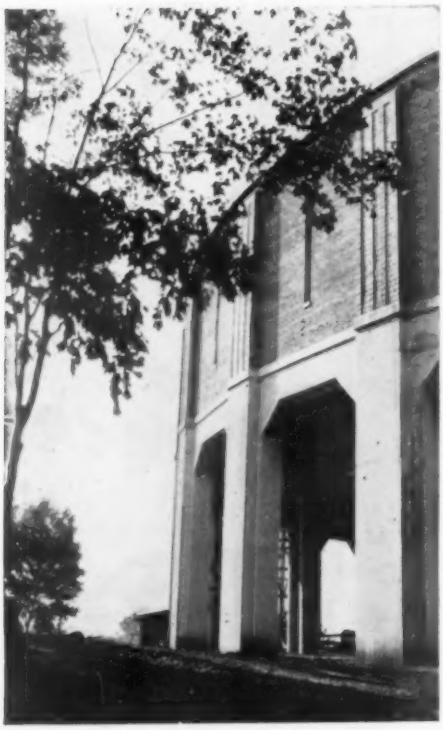
The lake intake, filter plant and pumping equipment of the city are all planned for a maximum draft of 20 million gallons daily. The average pumpage during the year is 6 million gallons daily, the maximum daily 11 million gallons, and the maximum hourly rate 20 million gallons. Thus the pumps and other structures cannot adequately supply the city at all times with water at sufficient pressure, and should a severe fire occur at the time of maximum pumpage, the results would be disastrous. Accordingly, steps were taken to provide proper storage at the opposite end of the city from the pumps, through the construction of the new 4-million-gallon elevated steel storage tank, masked with a surrounding curtain wall of brick pierced with windows to break the façade and furnish light within the 3-foot walkway between the tank and curtain wall.

The initial work was the construction of a 30-inch main from the nearest large main in the city to connect with the new reservoir. This work was done during the last ten months, using a large portion of welfare labor. By the completion of this connecting link and the new water tank, the pressure in the city will be equalized just as though another pumping station had been constructed at the site of the tank. Further, in winter it will be possible to shut down the pumps at the lake pumping station for as much as 24 hours to make repairs or adjustments to them, or to the filter plant, or to repair the intake.

The steel tank is built on ground having an elevation of 153 feet above city datum, which is 2 feet higher than the government datum for Lake Michigan. The bottom of



VIEW OF THE TANK BEFORE COMPLETION, SHOWING SPACE IN CURTAIN WALL TO PERMIT ERECTION OF STEEL TANK WITHIN



A CLOSE-UP OF THE EXTERIOR COLUMNS AND A GLIMPSE OF THE INTERIOR COLUMNS

the tank is at elevation 160 and has vertical sides 21 feet 7 inches high. There will be 20 feet of water in the tank when filled to the 18-inch overflow pipe. The tank, built by the Chicago Bridge & Iron Works, Chicago, Ill., is 185 feet in diameter, with a welded bottom of 5/16-inch plates resting on a 2-inch sand cushion carried by a 16-inch reinforced concrete floor slab. The tank has four rings of plates, the lowest being ⅞-inch thick and the top ring 5/16-inch thick. The roof, which is welded, is of 3/16-inch plate pitched 1 foot in 8 feet. It is to be painted aluminum color and will carry the name of the city in 10-foot letters with a north arrow. The rings of the tank are riveted. The inside of the tank is being treated with No-Ox-Id, using one coat to the overflow line, and the remainder of the tank inside and outside will have two coats of aluminum paint. The stairway leading to the walkway around the base of the tank between the brick casing and the tank will be painted with two coats of black enamel.

The Supporting Structure

The tremendous weight of the tank when filled with water required the construction of a very heavily reinforced concrete structure. This consists of 52 circular columns 30 inches in diameter, reinforced with 18 rods 1½ inches square and a spiral of ½-inch rods spaced 2½ inches. The columns are mushroomed into the 16-inch slab at the top. The footings for the columns are 12 x 12 feet and 26 inches thick, reinforced both ways with 1-inch round bars with hooked ends. They are designed for a ground pressure of 3,000 pounds per square foot.

The outside ornamental structure is composed of 28 concrete columns which carry only the weight of the brick curtain wall. They are reinforced with 11 bars of ½-inch diameter running vertically. The brick curtain wall is 8 inches thick, and has 18 windows with aluminum sash. Alternate windows open for ventilation. The construction of this structure required 3,481 cubic yards of concrete and was started October 17, 1932, and the pouring of the concrete continued throughout the winter, with all aggregates heated, and a 1:2:4 mix hauled 1½ miles from a central mixing plant in the city. Test cylinders were made at frequent intervals and sent to the University of Marquette for breaking in its laboratory. The results were very uniform and showed an average strength of 4,000 pounds per square inch at 28 days.

The tank itself was tested on June 22, 1933, for leakage in the bottom, by filling it to a depth of 10 inches with water and then blowing air at 10 pounds pressure through taps in the bottom and watching for bubbles. The test was very satisfactory; only a few minor leaks were located, and these were re-welded at once after the tank was drained.

Grading and Planting

The area beneath the tank has been graded and covered with a 3-inch layer of gravel rolled into the sandy clay, so as to provide shelter for those who use the area for picnics and in case a storm arises. At the center of the area where the 30-inch riser connects the main to the tank there is a brick wall enclosing an area 22 feet 6 inches square. This also encloses the overflow pipe, the automatic cone valve for controlling the elevation of water in the tank and preventing wastage through over-pumpage, and the pit where the valves are located.

There is a 6-foot concrete walk around the base of the structure at the edge of the columns, with a curb and catch-basins. Outside this a 14-foot grass plot has been graded, rising 6 inches so that it drains toward the walk. From this point out, the ground is graded on a 3 to 1 slope to meet the existing grade of the ground surrounding the tank.

The new ornamental water storage tank was built by the Water Department of Sheboygan, Wis. The basic designs for both the reservoir and the connecting 30-inch pipe line are by Arthur H. Miller, Superintendent of Water Works. The working drawings and specifications were prepared by The Jerry Donohue Engineering Co. and Edgar Stubenrauck, architect, both of Sheboygan. The resident engineer was J. C. Zupelt, of the Water Department, with Fred Wedemeyer as inspector. The general contractor for the work was the Immel Construction Co., of Fond du Lac, Wis., with William Scheer as Superintendent. The tank was erected by the Chicago Bridge & Iron Works, Chicago, Ill., with S. C. McCloud as Superintendent.

Essentials for Future City Growth

The city which will attract population will be the one that is consistently planned, is honestly built, and gives the most in service—that has the most spacious, convenient, and purposefully designed street thoroughfares; the most attractive parkways, parks and public squares; the finest recreation system; the most satisfying community life; where taxes are made less burdensome by long-term financial budgets; and where obsolescence and disintegration are treated more scientifically than heretofore.

—From a recent statement by the City Planning Division of the American Society of Civil Engineers.

Calcium Chloride as a Binder on Sand-Clay and Gravel Roads

By **L. L. BATEMAN**
County Engineer, Huron County, Michigan

DURING the past two years, considerable study has been made of the use of calcium chloride by highway engineers, with the object of enhancing its value as a dust-layer and also to determine whether or not it possesses other properties valuable in highway work, especially as regards maintenance and low-cost construction. The country is just at the beginning of a low-cost road era.

It is estimated that dust-layer on gravel roads has been costing from 30 per cent to 50 per cent of the cost of the surfacing material. In Michigan alone, the annual charge for calcium chloride amounts to a very large sum. Any investigation for the purpose of trying to reduce this expenditure is certainly worth while. We are thoroughly familiar with the fact that under certain atmospheric conditions, on certain gravels, and sometimes on certain subbases, we get varying results with calcium chloride. We have all heard the well-known complaint that "the chloride is no good this year." If we can discover the reasons for these apparent variations and can control the condition, we can at the same time get by with less chloride and considerably reduce the expense of dust-layer.

The idea of adding clay to gravel for binder purposes is probably as old as the gravel road system, but it is only recently that laboratory research combined with field tests has shown beyond question that when given certain mixes of the ingredients mentioned, we may definitely expect certain results under weather and traffic.

Definitions and a Dash of Theory

It is not the purpose of this article to go into a technical discussion of soils; but to understand the basic theory of sand-clay and gravel stability, and the relation of calcium chloride to it, one must be familiar with a few of the common terms used in this study. Stability is the resistance to lateral flow under all climatic conditions, wet or dry, hot or cold. Loose gravel, dry sand, and wet clay are distinctly unstable materials. A stable gravel road is a mixture of these soils, each present in the right proportion to secure the greatest benefit of its most desirable property as a road material.

In the laboratory work on these soils, all the material passing a 10-mesh screen is called the soil mortar, and all that passing a 40-mesh screen, the soil fines. The soil fines are of special importance, since that is the part of the material studied for stability characteristics. A gravel having a stable soil fine portion will have good stability even though the percentage of pebbles varies greatly.

There are five basic physical properties of soils; namely, internal friction, cohesion, capillarity, compressibility, and elasticity. The first two, internal friction and cohesion, are necessary to surface stability. Capillarity may be valuable to a certain extent, but the properties of compressibility and elasticity are wholly undesirable owing to their destructive qualities under varying weather conditions.

The sand and silt particles in gravel are the only part that possesses the property of internal friction. The amount of internal friction present depends upon the proportion of frictional material present; the degree of loading; and the grading, shape, and size of the individual particles. Knowing that silt possesses high capillarity, we commonly think of it as an undesirable part of a soil mixture, but a certain amount of it may be of value for its internal frictional properties.

There are two kinds of cohesion: that called true cohesion, such as supplied by sticky clay; and moisture cohesion, of which the most familiar example is a wet sand beach. Gravels with a very high clay content often resist wet weather because of the property of true cohesion, which causes the clay particles to resist being separated to make room for the entrance of water. In dry weather clay is stable and sand is unstable. In wet weather the opposite condition holds true. To get a stable mixture under all conditions, you must properly combine the two. Add the pebble needed to take the traffic wear, and you have a stable gravel surface. The degree of stability will depend upon the following factors:

(a) The clay content supplying true cohesion
(b) The water content supplying water cohesion
(c) The amount of compaction
(d) The grading of the silt and sand particles

If this stable mixture becomes wet, the clay in it expands, but the amount present is just sufficient to fill the voids in the sand grains without pushing them apart. This condition is the key to the success of the stabilized mixture, and it is the function of the laboratory to specify the correct proportion of the available sand and clay that will give the desired result.

The Bureau of Public Roads has developed several standard tests to measure the frictional, cohesive, and expansive properties of soil fines. They are being rapidly adapted to field conditions, and within a short time their use will be as common as the screen analysis of gravel. Using a minimum of each material, we shall be able to establish a combination that will insure the best results.

Calcium Chloride Enters the Picture

With the theory of the stable gravel mix in mind, we now arrive at the point in our study where calcium chloride enters the picture. The tendency of liquids to vaporize increases with higher temperatures. At any given temperature, every liquid has a definite vapor pressure or measure of its tendency to evaporate. If a solution of calcium chloride is placed in air with a high moisture content, it will dilute itself to the strength at which its vapor pressure equals that of the moisture in the air.

Keep in mind that calcium chloride itself does not vaporize but varies in solution strength only. This solution provides moisture cohesion to the upper part of a stable surface, and by its resistance to evaporation not only holds its own moisture but prevents that in the soil below from escaping.

When it rains, in the case of an unstable surface or subgrade, the calcium chloride solution becomes diluted and a portion of it is carried down into the ground water or into the ditches. If the surface is a stable one, water is absorbed in the same way and the solution of chloride carried downward, but immediately the clay particles in the soil fines expand and fill the pores in the mixture. Further rain is shed off and the chloride solution held close to the road surface. After the rain, when the top of the road dries out, the moisture that disappears is replaced by the chloride solution, which was stored below and is now brought up by capillarity. The solution evaporates to a strength where its vapor pressure equals that of the existing humidity condition. It remains at the surface during the dry period to continue duty as a dust-layer and soil stabilizer.

The Highway Research Board has conducted many tests on the moisture-holding capacity of chloride treated surfaces and has observed that treated surfaces can be obtained which will hold an equal moisture content at least ten times as long as an untreated surface.

It is evident that certain soil properties greatly increase the life value of calcium chloride in road gravels: first, stability of the surface; and then clay correctly proportioned to give cohesion without excess capillarity. The proportion of soil fines to coarse material must be sufficient to provide capacity for holding the calcium chloride solution and fill all voids, giving embodiment to the gravel particles carrying the wear. A lack of soil fines leaves open voids, which soon result in a loss of chloride solution due to washing, and subsequent raveling of the surface. There must be more fine material than is necessary to fill all voids or there will be no room for the solution to pass through when rain commences, and considerable solution will be lost by washing off the surface. The ideal condition is to have each gravel particle completely surrounded by a stable soil fine mixture.

Contrary to the opinion of many maintenance men, concentration of chloride solutions in low spots during wet-weather grading does not actually take place, since the solution has traveled downward in the surface and is stored below during this period.

Before calcium chloride came into general use as a dust-layer, it was the common practice to carry about one-half inch of a fine gravel mulch on the surface for blading material. This is now justified on untreated roads to prevent raveling, but such a mulch lying on a tightly bound chlorided gravel would cause a serious grinding action on the surface and the rapid formation of chatter-bumps. The ultimate goal of the gravel road maintenance man today is to provide a smooth, tight and dustless surface with a minimum of loose pebble, which is not only valueless to the surface but does actual harm.

Gravel Road Maintenance Past and Present

The use of chloride-treated stabilized soil fines will probably prove most valuable in the stabilization of loose gravel roads. In the past, the common practice of repairing gravel where the combined action of weather and traffic removed the fines, has been to grade off the loose material, which then constitutes a dead loss to the surface, cover it up with more gravel, which is liable to become too rich by incorporation of the extra pebble, or to spread clay over it as a binder. The use of clay resulted in a mat of clay-bound pebble of varying thickness through which water easily passed. Large pits quickly developed in rainy weather, and in dry weather the clay mat did not have sufficient strength to stand high-speed traffic and soon broke loose.

The best recent practice is to scarify the loose gravel surface to a depth of about 3 inches and treat the whole mass of loosened material with enough clay to give maximum stability. The necessary amount is determined by a mechanical analysis of several representative samples, from which the 40-mesh screenings, or soil fines, are mixed with varying quantities of pure clay from the best available clay pit until a mixture is secured with the desired measure of cohesion as expressed by the standard tests. The quantity of loose material on the road is estimated, and from the mechanical analysis the proportion of soil fines is computed. Having already learned the proportion of pure clay in the available supply and knowing the amount required in the perfectly stabilized test sample, a simple problem in proportion gives the amount of available clay required per mile of road. The work on this subject so far indicates that the quantity of clay and silt present should be about 30 per cent of the soil fines portion. The properties of clay are highly variable, but the main objective is to get a highly cohesive clay in which the quantity of silt present is less than 50 per cent of the clay content. Silt is usually found in it and may be the source of much trouble. It can be distinguished by its fine, gritty feeling, while pure clay has a sticky, gluey feeling.

Because of the smaller amount necessary, it usually pays to get the best quality clay free from silt and sand, even though it has to be hauled many miles. The sandy tops of clay pits should first be stripped off. As a rule, avoid ditch banks, since they are inclined to be silty. Hillside cuts usually give the best quality clay.

Occasionally the computed amount may have to be varied in the field by the use of less clay or the admixture of a little sand, owing to shady conditions, a wet subbase, change in quantity of loose pebble, etc., but the general plan will hold true.

The clay is usually loaded with a power shovel and hauled by dump trucks, from which a uniform spread at a predetermined rate can be made on top of the scarified surface. Since the clay will not break up while moist, it must be dried first and then pulverized. Blading, working under traffic, and rolling are some of the operations employed. If the dust becomes a serious problem, blade off the loose material into a windrow on the shoulder and hasten the operation with a pulverizer. The reason for air drying the clay before mixing with the scarified gravel is quite evident if you take two lumps of clay, one air-dried and the other lump damp, and put each into a glass of water. The air-dried lump will slake; that is, water will enter the pores, causing expansion, and flakes of clay will break off until the whole lump is crumbled. The damp lump will remain solid in the glass.

Air-dried clay will mix readily with the gravel, and

the first rainfall will place the clay in a finely divided pasty condition best suited for sticking the soil ingredients together. If it fails to rain to provide the necessary moisture, give it a calcium chloride treatment of 2 tons per mile to lay the dust, and wait until it does rain to finish the job. Then thoroughly mix the materials with a power grader or maintainer and do the final shaping while the surface is in the drying-out stage. If the subbase is suitable to carry traffic, all the loose material can be left on the side of the road until it rains and can then be worked. After the final shaping is completed, add chloride at the rate of 2 tons per mile, with subsequent treatments of from 1 to 2 tons per mile when required.

An Example

There is a 2.2-mile gravel gap on the county road just south of Caseville in Huron County on which there has always been trouble with loose pebbles. This road has a water-bound macadam base, built for the most part on a sandy subsoil. It carries an average daily traffic of 600 vehicles, which is increased to a maximum of 1,200 over week-ends during the tourist season. The proposition of placing an asphalt retread surface on it was turned down by the Board of Supervisors at their June session in 1932. As a result, we were left with a badly raveled gravel road to carry a heavy summer tourist traffic already started. The sand-clay and chloride method of stabilizing the surface was decided upon as the best way out of a bad situation.

Estimating the amount of loose material on the road above a 10-mesh screen size to be about 300 tons to the mile, it was found that about 60 to 80 cubic yards of clay such as was available would be required. The clay was ditch bank material found close by and tested for us in the laboratory of the Dow Chemical Co. at Midland. It contained too much sand and silt for the best results according to our theory of a perfect mix, but owing to the lack of a better material within an economical hauling distance, we added a slightly larger quantity than called for by the tests and used it.

The spread was made with dump trucks and the rate increased above 60 yards per mile whenever an extra amount of loose gravel was encountered. A total of 152 cubic yards was actually used in the 2.2 miles. The clay was fairly dry when spread, and one day's drying under traffic began to cause a serious dust hazard. Luckily, it rained that night and the rain continued part of the next day. One motor grader worked the material back and forth until thoroughly mixed and practically dried out. This resulted in a clay-bound gravel that still needed sand for stability. There was also insufficient thickness to carry the traffic. It was therefore decided to add a tested local gravel in the proper proportion to secure the desired stability of the soil fines, and again the laboratory provided the necessary data. About 130 cubic yards per mile of screened gravel was added and, as before, a fortunate rain made mixing possible immediately. This was done with a power grader and the drying mass finished off with a maintainer on July 13, 1932. It rained again on July 14 and 15. On July 16 while the clay gravel mix was still wet, 125 sacks of calcium chloride were applied over a 20-foot width, or at the rate of 2.25 tons per mile of 16-foot road. Since the surface had softened and was rutting slightly under traffic, the whole mass was reworked and the calcium chloride mixed into it.

The following day the surface was extremely hard, with very little loose material on it. The grader man was given instructions to remove this loose pebble and then to keep off until the surface showed pitting or rutting after a rain. Our reports show that this 2-mile section was graded only twenty times from July 17 to December 31. We are positive this record would be better yet if it had not been for the fact that the grader man had to travel this road to reach another section and undoubtedly graded it when not really necessary.

The surface remained in perfect condition during the rest of the summer and required no patching except a few places along the edge of the stabilized material. A ton per mile of calcium chloride was added in September, making a total of slightly less than 4 tons per mile for the season. There was no deterioration or slipperiness through a very wet fall, and this uniformly good condition extended into the winter.

A considerable mileage of gravel on M-20 west of Midland has been treated according to this method, with excellent results. This trunk line carries a daily average traffic of about 700 vehicles, a large percentage of which are heavy trucks from the oil fields. The maintenance records show only ten round trips with a grader from June 30 to October 22, when a rainy period set in that evidently necessitated almost daily blading while it lasted.

Further Use of Calcium Chloride as a Binder

Another field where stabilized soil fines and chloride will supply a great need is in resurfacing material with deficient binder. About three years ago we came to the conclusion in Huron County that something had to be done about providing binder in our two largest county-owned gravel-pits. There are plenty of sand in the material, but it would not stay bound up through the dry summer months. After considerable investigation a clay bank of the best cohesive quality, about a mile from each pit, was purchased. In the fall enough clay was hauled to fulfill the next season's binder requirements, spreading it from 3 to 5 feet deep over the top of the stripped gravel. It freezes through the winter, which results in a very complete pulverizing. In one pit, wheeled-scrapers were used to bring the gravel to the belt conveyor leading to the screen, which makes mixing easy. In the other pit, a clamshell does the proportioning while filling the screen. The addition of about 20 per cent of the bank clay gives the desired results, although this is varied occasionally to fit changing surface conditions.

Laboratory tests show that the bank material is only about one-third pure clay, so that there is actually about 7 per cent pure clay in the combination. The cost of the clay is about 4 cents per cubic yard of screened gravel, which is fully justified in the light of the benefits derived. Far more service is derived from the chloride applied, and the general surface conditions are greatly improved. Under the old plan, the surface thickness was gradually being reduced. Tests now show that a season's stabilized resurfacing material is more than sufficient to take care of the season's traffic.

The chief disadvantage of adding clay at the pit instead of on the road is that it takes the supply longer to dry

out after a rain, since it lies in a bank. In resurfacing work, however, it is felt that this is overbalanced by the advantages of easy mixing, a better control of quantities, and the avoidance of a dust nuisance before the chloride is added, owing to the fact that the clay-gravel mixture starts to pack under traffic even though dry.

It is believed that chloride applications should be made in quantities of not to exceed 2 tons per mile, and only under favorable moisture conditions unless it is absolutely necessary to do otherwise. Frequent applications of a small amount when there is moisture in the gravel to hasten its dissolving and when traffic is light during the night or early morning, will greatly decrease the loss of chloride and give far greater efficiency from the solution that enters the surface. There is a heavy loss of the solution when placed on dry loose gravel through the hottest part of the day and in heavy traffic.

These losses may be overcome by storing chloride and re-handling it in order to be in a position to apply it under the most favorable conditions. If it cost as much as one dollar per ton to re-handle, that would be only approximately 5 per cent of the cost, and it is safe to say several times that percentage has often been lost on the results obtained by unfavorable application.

Blading-off any loose pebble to the edges is an important item in the maintenance of a sand-clay gravel surface, since these pebbles grind out the surface under traffic and quickly cause raveling if left on the road. Blading after a rain must be done quickly, before the rapid drying surface gets too hard. It should be stopped as soon as the surface is dry, or disintegration of the material will result and leave a considerable amount of loose pebble on the top. Rainy weather pitting, if it should occur, can be helped by a slightly greater road crown to carry the water off.

The chloride content carried through the winter in a good gravel surface is probably not much more than one ton per mile. A great saving in soil fines could be effected by a light early spring application. There has been considerable loss in Michigan during the month of May, after spring rains are over, when hot drying winds cause a dusty condition equivalent to that of midsummer.

Favorable Conditions

The conditions favorable for application of calcium-chloride are: a tight surface; damp gravel and humidity conditions for quick solution; and, finally, a small flake which has the maximum surface exposed and will consequently absorb moisture more rapidly. All these conditions tend to prevent the removal of the solution from the road, which is the only way that the effectiveness of calcium chloride can be destroyed. The ideal situation is to maintain a calcium chloride content of from 2 to 3 tons per mile of 16-foot road, keeping that as nearly constant as possible by light applications when required but placed only under the most favorable atmospheric conditions. Using this method, there will be less blading and surfacing cost, with a continuous dustless condition, at no increase in the amount of chloride. There should be less patching required because the tight surface will not absorb water when rainy or gravel when dry. The reduction in labor costs alone will amount to a considerable saving.

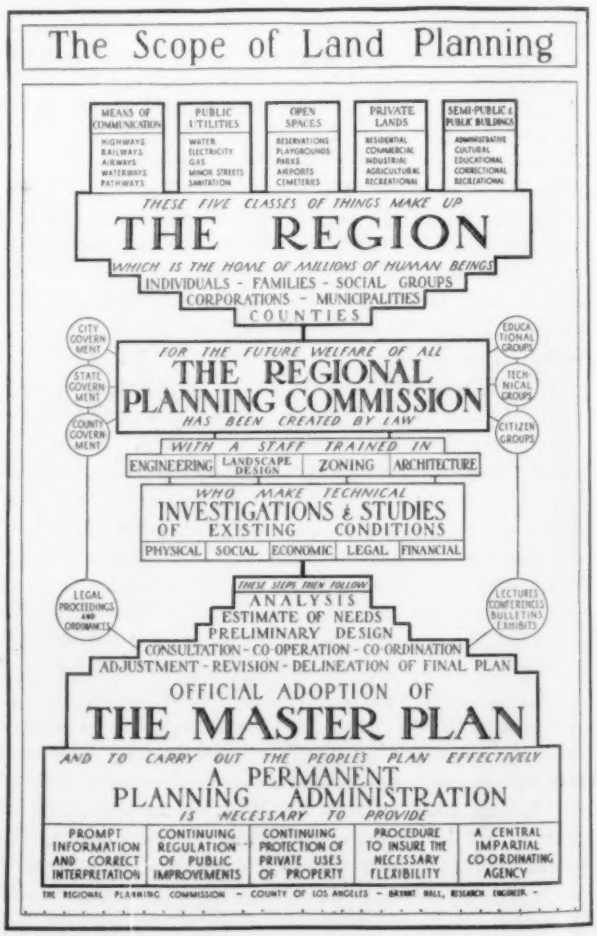
The use of calcium chloride in sand-clay roads is being given less emphasis in this discussion, for two reasons: the subject of stabilized gravel is of far more interest and importance; also several agencies are engaged in the testing of sand-clay surfaces on a large scale and it is practically certain that, when their results become available, many of the present notions concerning sand-clay mixtures will have to be revised.

The principles of construction will undoubtedly follow closely those already described for the stabilization of gravel. On sand bases, it will be necessary to use a weathered clay to get easy pulverizing. Water, when easily available, may be used for slaking instead. On clay bases, the problem of getting sand with good frictional properties within economical hauling distances will be more difficult. This may be offset by the ease of scarifying and grading loose clay to the shoulders where it can be dried and pulverized before the sand is hauled. The addition of calcium chloride to the mixture has the same important value as in the case of stabilized gravel; namely, that of providing moisture cohesion to the mixture, with the indirect result of keeping out the rain from above and holding the capillary water below.

ACKNOWLEDGMENT.—From a paper presented at the Annual Conference on Highway Engineering, at the University of Michigan.

A Chart Which Tells Its Own Story

Activities and Organization of the Regional Planning Commission of Los Angeles



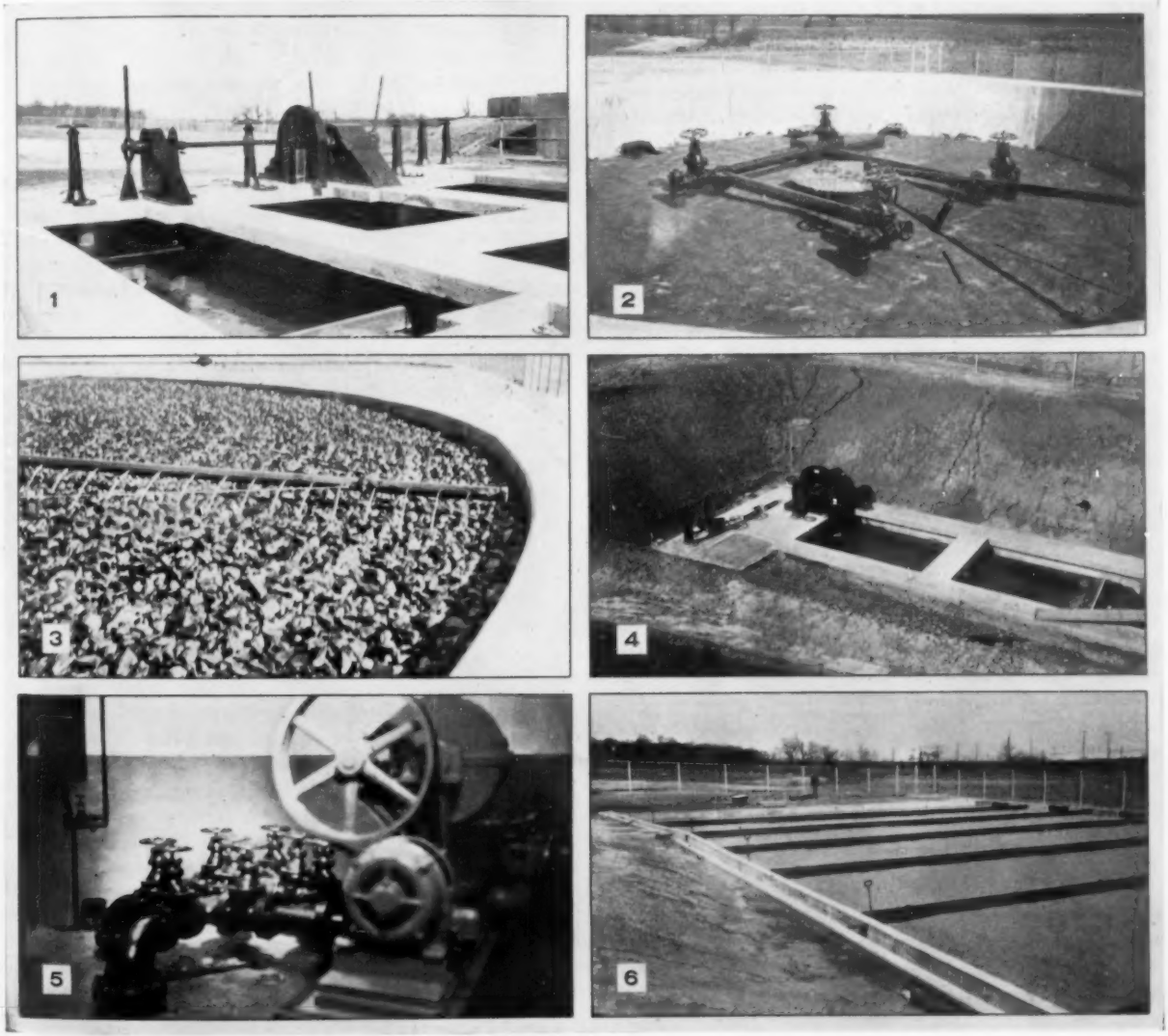
From Disposal by Dilution to Separate Sludge Digestion

Wilmington, Del., Builds Its First Sewage Treatment Plant

WILMINGTON has recently completed the construction of a separate sludge-digestion sprinkling-filter sewage treatment plant capable of handling the wastes from 5,000 people. It serves a rapidly developing section in the northern part of the city. This is the first sewage treatment plant in the city of Wilmington. Heretofore all the sewage has been discharged raw into Brandywine Creek or the Christiana River. Into the design of the plant, to which only 63 houses are now connected, has gone every modern development in the art of sewage treatment by the separate sludge digestion method, so that it will virtually act as a full-scale experimental plant for all future work in the city.

Two Trunk-Line Sewers

Two trunk-line sewers serve the plant, one coming across fields which are laid out on the development maps as future streets. The other sewer comes in from the



SCENES AT THE NEW SEWAGE TREATMENT PLANT AT WILMINGTON, DEL.

1. The initial settling tank. 2. The Downes floating cover on the sludge digestion tank. 3. One arm of one of the revolving sewage distributors. 4. The final settling tank. 5. The Marlo sludge pump and the eight control valves. 6. The open sludge drying bed

THE OFFICE BUILDING AND LABORATORY

opposite direction on stilts, across a swampy section filled with ashes. The roadway giving access to the plant is also built up on refuse and ashes. As the plant receives only domestic sewage, the grit chamber is very small, and when any of the three sewer gangs which are out working in the district flush any of the sewers in which grit may have accumulated from storm waters entering sewers under construction a by-pass at the grit chamber is opened and the whole material run through to Shellport Creek. Considerable good work is being accomplished with the sewer gangs made up of unemployed men. Actual timing of the flow of water from certain flushing stations has shown a considerable speeding-up of the flow after two or three flushings.

Settling Tanks

The sewage as received at the plant is passed through the small grit chamber and a small sloping bar screen, which is cleaned by hand as required. Three settling tanks are provided with wing gates in the distributing flume, so that the flow to each compartment can be closely regulated. Cut-off gates completely shut off the flow from any tank as desired. At present only one tank is used, with a second held filled during the time that the sewers are being flushed, so that any excess organic matter can be cared for readily.

The tanks are equipped with Link-Belt sludge collectors which remove the accumulated sludge to hoppers at the influent end of the tanks. A V-notch weir with a Gurley water-wheel recorder measures the flow through the tanks as it goes to the dosing tanks. There are two dosing tanks, only one of which is in use at the present time. These are equipped with Adams-Hankin dosing siphons which intermittently dose the Adams revolving sewage distributors. There is a by-pass just ahead of the dosing chamber for use in case it is necessary to work on both of the distributors.

Sprinkling Filter Equipment

The two sprinkling filter beds are each 75 feet in diameter, inside measurement, and have an average depth of 5 feet 6 inches. They are filled with 2½-inch trap rock over half-round slotted tile underdrains furnished by the Robinson Clay Products Co. The effluent pipe is a 10-inch cast iron line with a valve for each bed, so that the beds may be flooded to check any nuisance from the sewage fly. The effluent flows to the final settling tank, which is also equipped with a Link-Belt sludge collector.

Sludge Handling

The sludge from the settling tank and the final settling tank runs through to a sludge hopper 4 feet below the level of the settling tanks, the flow of the sludge being controlled by a valve in each case. A Marlo motor-driven sludge pump with adjustable eccentric handles the sludge from both sets of settling tanks and pumps it to the two 24-foot diameter sludge digestion tanks. Suction connections are also provided for the supernatant liquor and for recirculation of sludge. A manifold on the suction side of the pump with eight Chapman valves permits any combination of pumping from or to any point. By opening a certain set the preliminary tanks can be emptied into the final settling tanks without any pumping whatsoever. The sludge pump is set in a house formed by the two circular digestion tanks and a wall tangent to both of them. In this housing also is the equipment necessary for the utilization of the sludge gas for heating the digestion tanks, including three Bristol recording thermometers, one for sludge temperature in each digestion tank and one for the hot water, a National Radiator Corporation gas boiler, a Pacific Flush Tank combination flame trap, and a Pittsburgh Equitable gas meter.

One single 8-inch discharge pipe from the sludge pump carries the sludge up to a siamese connection to sludge headers on each tank. A 6-inch discharge pipe and valve is used for handling the supernatant liquid to spray and break up any scum.

The sludge digestion tanks have an effective depth of 13 feet and are equipped with Downes floating covers, temperature-recording thermometers, and three draw-off valves in each tank for the supernatant liquor. Three coils of 2-inch pipe located within 5 feet of the bottom of the tank and suspended on the walls are provided for heating the sludge.

A draw-off pipe from the sludge digestion tanks permits running the sludge out onto the sludge drying beds at any time. The sludge bed area is 70 x 105 feet and is divided into 7 beds by creosoted stop planks. The beds are underdrained with 6-inch round tile with open joints in 12 x 12-inch trenches and covered by 6 inches of broken stone. Over the stone is 3 inches of pea gravel and on top 6 inches of sand. A 6-inch concrete wall surrounds the entire bed.

The main effluent pipe from the plant is a 20-inch terra cotta line.

Office Building and Laboratory

A face brick office building is provided with an attractive slate roof, scrapers at the doors and a built-in garage in which the oil-burning heater is located. Ample space for a complete laboratory for a trained operator is provided, and with this equipment sewage works operators may look to Wilmington for valuable research in the field of separate sludge digestion. With the ample equipment provided throughout the plant, remarkable control over the various stages of the treatment will be possible, and with a plant that is considerably under-loaded at present, complete studies will be possible with the increasing load in the next few years.

The plant was designed and construction supervised by the city's own engineering forces. Robert A. Voelker was the designing engineer under the direction of Harry L. Maier, City Engineer.

Solutions of the Problems of Rate Making for Water Service

By E. E. BANKSON
The J. N. Chester Engineers, Pittsburgh, Pa.

PROPER water rates for a private utility contemplate a fair return on a reasonable property value over and above all operating costs, including administration, taxes and depreciation; and the same test fairly indicates the maximum water rates for a municipal plant, except that greater leeway of discretion is accorded municipal administration. Our first problem, therefore, is to obtain, or create, a complete valuation of the property involved; either from cost records or by a detailed inventory and appraisal, as depreciated to present value.

The plant value should be divided among the various plant and operating functions; in order that the "fair return" and "depreciation" thereon, together with all operating costs, may be properly allocated to each functional service group. Figure 1 offers one sample of summarized plant value according to the account numbers of a certain uniform classification. The overhead items must be prorated to the various account numbers, before application to a rate study, and then we are ready to allocate the several items of annual costs to the different classes of service.

A Method of Cost Analysis

So far as known to the writer, sound principles of rate making for water service were given to the public for the first time by the final report of the Committee on Private Fire Protection Service, appearing in the 1919 *Journal* of the American Water Works Association (pages 679 to 784 inclusive). Although the work of that Committee covered a very small part of the picture of rate making for water service, the Committee properly felt that it must prepare the entire picture in order to clearly place that part with which it was dealing.

The formal report of the Commitee divided all costs of service into

(1) Proportional, or output, costs
(2) Fixed service, or capacity and customer costs

The report then went on to state that "a correct analysis of service costs clearly indicates that the separation of fixed service costs and proportional service costs is not a subtle distinction but a rational separation based on the fundamental principle of assessing the fair cost of the service to each consumer."

The basic idea contained in both the foregoing references is well stated by the Committee report in these words: "In every plant, sufficient capacity to meet the maximum demand must be provided in addition to the capacity necessary to meet the ordinary and usual daily demand, and the capacity represented in the demand cost is the *surplus* capacity of the system required to meet those unusual or spasmodic demands. . . .

"The theory on which operating expenses and fixed charges are divided between proportional and fixed service charges is that the direct operating expenses as well as interest and depreciation, *or* sinking-fund payments, on that portion of the plant which is utilized in producing and delivering the *normal* service requirements should be included in the proportional charge. Whereas, the material, labor and interest or sinking-fund appurtenant to the *reserve* capacity should be charged to the capacity or demand cost," together with the customer cost to the total of what the Committee report terms "fixed service costs."

The service cost data of Figure 3, as carried from Fig-

FIGURE 1
FINAL SUMMARY—AS OF APRIL 1, 1931, DEPRECIATION ON BASIS OF 4% SINKING-FUND

Acct. No.	Item	Reproduct. Cost New	Annual Deprec'n	Accrued Deprec'n	Present Value
205	Rights-of-way	$ 5,529	.....	.....	$ 5,529
206	Water diversion rights	50,000	.....	.....	50,000
207	Water-supply reservoir	404,860	.....	.....	404,860
208	Impounding reservoir	461,911	$ 44.55	$ 1,929	459,982
210	Deep wells	630	4.16	9	621
212	Collecting and intake	2,100	13.86	73	2,027
214	Supply mains	41,194	4.94	266	40,928
215	Other conduits	40,972	2,914.95	245	40,727
218	Coagulating basin	11,783	102.55	2,431	9,352
219	Filter plant	47,153	198.43	7,845	39,308
220	Clear-water basin	42,579	22.41	1,185	41,394
223	Chemical treatment equipment	1,500	26.70	283	1,217
224	Laboratory equipment	3,360	59.81	323	3,037
234	Land—pumping	3,708	1.49	45	3,663
236	Pump station structure	28,033	79.61	2,350	25,683
237	Pumps and equipment	66,242	682.84	4,124	62,118
238	Boilers and equipment	31,969	123.66	3,158	28,811
241	Gas engines	11,000	916.30	.....	11,000
242	Electric equipment	12,773	134.12	1,468	11,305
245	Distr. rights-of-way	2,110	.....	.....	2,110
246	Transmission mains	30,710	5.86	158	30,552
247	Distribution reservoir	41,519	4.69	457	41,062
248	Distribution mains	543,460	1,272.09	21,825	521,635
249	Service lines	104,291	253.00	5,742	98,549
250	Meters	99,870	2,396.88	12,943	86,927
251	Fire hydrants	17,225	113.69	1,705	15,520
253	General office land	12,000	.....	.....	12,000
254	Other general land	795	36	11	784
256	General office structure	33,000	89.10	4,714	28,286
257	Other general structures	10,800	32.28	2,221	8,579
	Total construction	$1,584,432	$9,498.38	$75,510	$1,508,922
	Total land and rights	578,644	.....	.....	578,644
		$2,163,076	$9,498.38	$75,510	$2,087,566
	Omission, cont'g's & super. 10%	158,443	949.84	7,551	150,892
	Gen. administration 1.5%	23,766	142.47	1,132	22,634
	Prelim. and organis. cost, 1.5%	26,500	.....	.....	26,500
	Int. during construction				
	5% on $1,766,641	88,332	529.53	4,210	84,122
	10% on 605,144	60,514	.....	.....	60,514
258	General office equipment	5,000	.....	500	4,500
259	Other general equipment	7,000	.....	3,300	3,700
	Materials and supplies	7,000	.....	.....	7,000
	Operating capital	7,000	.....	.....	7,000
		$2,546,631	$11,120.22	$92,203	$2,454,428
	Cost of financing	190,997			190,997
	Going value	200,000			200,000
	Totals	$2,937,628	$11,120.22	$92,203	$2,845,425

FIGURE 2
TABLE NO. 1—COST ANALYSIS OF WATER SERVICE—ALLOCATION OF ANNUAL BURDEN

Plant Function and Service Divisions	Annual Costs	Allocation to Service: Output Cost	Demand Service	Customer Costs	Fire Service
Fixed Costs, Including Annual Depr.					
Plant and reservoirs	$58,700	$29,350	$14,675	.....	$14,675
Rising mains	4,100	2,050	1,025	.....	1,025
Supply mains	28,400	14,200	7,100	.....	7,100
Distribution mains	28,400	.....	7,100	$14,200	7,100
Service lines	3,000	.....	.....	3,000	.....
Meters	7,000	.....	.....	7,000	.....
Hydrants	2,100	.....	.....	.....	2,100
Totals	$131,700	$45,600	$29,900	$24,200	$32,000
Operating Costs, Including All Taxes					
Supply costs	$46,500	$45,000	$1,000	$	$ 500
Distribution	20,000	5,000	5,000	5,000	5,000
General	38,000	15,000	2,000	20,000	1,000
Sub-total	$104,500	$65,000	$8,000	$25,000	$6,500
Taxes (approx.)	13,800	5,100	3,100	3,100	2,500
Total operating	$118,300	$70,100	$11,100	$28,100	$9,000
Total annual burden	$250,000	$115,700	$41,000	$52,300	$41,000

FIGURE 3
TABLE NO. 2—COST ANALYSIS OF WATER SERVICE (Cont'd)
AVERAGE UNIT COSTS FOR THREE GROUPS OF SERVICE

Items	Totals 100 Cu. Ft. Per Yr.	Domestic Class	Middle Class	Large Users
Physical Data				
1—Number of consumers	7,190	6,700	480	10
2—Customer ratio	.....	1	5	25
3—Rated units	9,350	6,700	2,400	250
Water Delivery				
4—Sales per year	864,000	402,000	240,000	222,000
5—Average each	.....	(60)	(500)	(22,200)
6—Prorated losses	436,000	312,000	112,000	12,000
7—*Total pumpage*	1,300,000	714,000	352,000	234,000
8—Ratio of excess demands	.....	3	2	1
9—Excess demand units	3,080	2,142	704	234
Cost Data				
Output cost (By-7)	$115,700	$63,600	$31,300	$20,800
Demand cost (By-9)	41,000	28,500	9,400	3,100
Customer cost (By-3)	52,300	37,500	13,400	1,400
Fire service cost	41,000	15,400*	.....	.....
Total costs	$250,000	$145,000	$54,100	$25,300
Average cost per 100 cu. ft.	.....	36¢	22¢	11¢

*To make up the shortage of rate schedule for fire service.

ure 2, are allocated to three classes of customers, depending on size, whereas the service cost data of Figure 5, as carried from Figure 4, are allocated to four groups of customers as indicated by meter sizes, and other groupings may be adopted as circumstances warrant.

The method presented herein appears in bold contrast to the two principal schools of thought in vogue prior to the dates noted, where the one school of thought might be expressed in the words of Allen Hazen (at page 474 of the 1916 *Journal* of New England Water Works Association):

"First, the cost of supplying water, including all the costs that there are, up to the point when the water is delivered under pressure at a reasonably *central point*. This includes interest and depreciation on the *whole* investment of supply works and all operating expenses, thereto, and this cost is the first part of the meter rate. That ought absolutely to go with every gallon of water that is supplied, and it ought to be uniform to every one, whether a person takes one gallon or a million."

In contrast to this latter idea, that the entire cost of water supply should go as an output charge, the claim by the second school of thought started with the idea that the utility must meet certain fixed and administrative charges whether water is delivered to the customers or not; that the plant must stand ready at all times to render any amount of service from the minimum to the maximum;

FIGURE 4
COST ANALYSIS OF WATER SERVICE
TABLE NO. 1

Items	Annual Burden	Output Cost	Demand Cost	Fire Protection	Consumer Costs
Fixed Costs:					
Impounding	$63,000	$63,000	.....	.....	.....
Purification	80,000	44,000	$16,000	$20,000	.....
Pumping	40,000	20,000	10,000	10,000	.....
Transmission	20,000	10,000	5,000	5,000	.....
Storage	40,000	18,000	10,000	12,000	.....
Feeder mains	50,000	20,000	12,500	17,500	.....
Lateral mains	80,000	.....	.....	40,000	$40,000
Fire Hydrants	10,000	.....	.....	10,000	.....
Service lines	20,000	.....	.....	.....	20,000
Meters, etc	25,000	.....	.....	.....	25,000
Sub-total	$428,000	$175,000	$53,500	$114,500	$85,000
General	10,000	4,500	1,000	2,500	2,000
Total fixed costs	$438,000	$179,500	$54,500	$117,000	$87,000
Operating Costs:					
Collecting and impounding	$6,000	$6,000	.....	.....	.....
Purification	60,000	55,500	$2,000	$2,500	.....
Pumping	100,000	95,000	2,500	2,500	.....
Transmission	6,000	3,000	1,500	1,500	.....
Storage	10,000	4,500	2,500	3,000	.....
Distribution—large	10,000	4,000	2,500	3,500	.....
Distribution—small	20,000	.....	.....	10,000	$10,000
Fire hydrants	5,000	.....	.....	5,000	.....
Service lines	10,000	.....	.....	.....	10,000
Meter red. and M	10,000	.....	.....	.....	10,000
Bill and collect	15,000	.....	.....	.....	15,000
Sub-total	$252,000	$168,000	$11,000	$28,000	$45,000
General costs	10,000	6,500	500	1,000	2,000
Total operation	$262,000	$174,500	$11,500	$29,000	$47,000
ANNUAL BURDEN	$700,000	$354,000	$66,000	$146,000	$134,000

and that if no service of any kind be demanded from the plant for a certain period, the utility would still be called upon to hold in readiness its entire plant, together with all production labor, as well as sufficient plant operation to overcome leakage and losses, to the end that full pressure be maintained at all times in the system. On this basis, its advocates do claim (in contrast to the first school) that the entire costs of interest and depreciation on water-supply works, together with all operating expenses sufficient to maintain a normal pressure in the distribution system, should be carried in the service charge, along with customer costs, so that the remaining costs provide a relatively low figure as output charge.

The method of computation here submitted is one based

FIGURE 5
COST ANALYSIS OF WATER SERVICE
TABLE NO. 2

Items	Totals	Groups of Consumers ⅝"	¾" — 1½"	2" — 4"	6" — 12"
Physical Data:					
Consumers—No.	20,220	19,000	1,000	200	20
Customer ratio	.....	1	5	10	20
Service units	26,400	19,000	5,000	2,000	400
Water sales yr. ave. M. cu. ft.	.....	6	50	900	10M
Mil. cu. ft. total	544	114	50	180	200
Leakage and loss	264	190	50	20	4
Pumpage prorated	808	304	100	200	204
Demand ratio	.....	4	3	2	1
Demand Units	2,120	1,216	300	400	204
Cost Data (from table No. 1)					
Output cost	$354,000	$133,000	$44,000	$88,000	$89,000
Demand cost	66,000	38,000	9,000	12,000	7,000
Fire service	146,000	.....	.....	.....	.....
Consumer	134,000	97,000	25,000	10,000	2,000
Total cost	$700,000	$268,000	$78,000	$110,000	$98,000
Equivalent straight rate per 100 cu. ft.	13¢	23.5¢	15.5¢	6¢+	5¢−

on conditions found in the business of supplying water, and produces rational results in a rate for both small and large quantities of water.

After figures have been found for the average cost of service to each type of consumer, by the method here submitted, it is merely a problem of cut-and-try in the development of a rate schedule which will produce average charges in keeping with the cost figures. As an example of application, Figures 6 and 7 were used in a recent study to test the gross revenues which would be produced by the application of a certain rate schedule to a situation where existing rated customers are being transferred to metered or measured service.

Thus it appears that a logical analysis of total service costs will indicate a fair range of rates as between the small and large users of water, or between the small and large customers. Be it noted, however, that circumstances are sometimes encountered where figures must be molded by judgment and good business discretion; so long as revenue results to a sufficient advantage.

Public Fire Protection

Figures 2 to 5 inclusive allocate and segregate the fair cost for fire protection service, which should cover both public and private fire protection service for any particular case; but upon this subject also there has been divergence of opinion to what might be termed three different theories of computation; as follows:

(A) The "Comparative Plant Method," which contemplates the design of two separate and distinct systems where the relative proportions of cost for design and operation of such separate estimated systems would indicate the proportion of the actual costs to be borne by fire protection on the one hand and general water service on the other.

(B) The "Proportional Plant Method," as herein contemplated, where the proportion of actual costs should be

FIGURE 6

CLASSIFICATION OF CUSTOMERS—COMPUTING THE REVENUE BY PRESENT WATER RATES APPLIED TO ALL SERVICE WHEN FULLY METERED (BUT EXCLUDING PRESENT FREE SERVICE)

Range in Hundred Cu. Ft./Mo.	Present Meters Inside City	Outside City	Rated Accounts Now	Total Sewer Connect.	Hundred Cu. Ft. Per Mo.	Group Number	Total Hundred Cu. Ft.
1	43	39	400	487	487		
2	37	23	400	460	920		
3	56	25	703	784	2,352		
4	59	14	500	573	2,292		
5	75	11	267	353	1,765		
6	67	9	146	222	1,332		
7	48	7	115	170	1,190		
8	45	2	36	83	664		
9	36	3	25	64	576		
10	39	10	10	59	590		
0 to 10	510	143	2,602	3,255	12,168	3,255	12,168
11 — 25	183	24	21	228	3,588	228	3,588
26 — 40	38	6	..	44	1,405	44	1,405
41 — 55	13	3	..	16	766	16	766
56 — 80	10	2	..	12	772	12	772
81 — 90	3	1	..	4	344	....	....
91 — 100	3	1	..	4	387	....	....
Over 100	17	5	..	22	8,530	30	9,261
	777	185	2,623	3,585	27,960	3,585	27,960

borne by each service in proportion to the capacity use for each function of the plant, based on peak load requirements; sometimes termed the "Peak Load Theory."

(C) The "Excess Plan Method," which contemplates that fire protection charges should be based upon only the *extra cost* by the extra portion of the plant made necessary, especially by reason of fire protection service; over and above the cost of the plant which would be required to meet general service demands.

In the opinion of the writer, the first method involves too much costly labor in rate-making procedure, and the last method is untenable because it favors one class of service as against all other classes of service, and therefore constitutes discrimination.

A full discussion of charges for fire protection service, by Metcalf, Kuichling and Hawley, is to be found in the 1911 Proceedings A. W. W. A. (at page 55), wherein detail opinion is given departing from the idea that "approximately half of the entire cost of water works is involved by the cost of fire protection service," as follows:

"It is believed that a fair statement of the truer conditions would be to say that the cost of the portion of water-works plant involved by fire protection service properly constitutes from 60 to 80 per cent of the entire cost of physical property in communities of less than 5,000 population, 20 to 30 per cent in communities of 100,000 population (more or less) and perhaps 10 to 20 per cent in the case of our largest cities."

Computations and tabulations there indicate the proportional *capacity* of the pipe system chargeable to fire protection service, ranging between 74 and 83 per cent at 10,000 population down to between 4 and 9 per cent at 300,000 population; that the proportional *cost* of water-works plant chargeable to fire protection service ranges between 50 and 56 per cent at 10,000 population down to between 2 and 4 per cent at 300,000 population, where sufficient plant capacity is provided to meet requirements of the National Board of Fire Underwriters or the lesser Kuichling Standard.

The Metcalf, Kuichling and Hawley analysis, of 1911, further reduced the proposed charges for fire protection service at an annual per capita equivalent in figures ranging from $1.53 per capita for 5,000 population down to 63 cents per capita for the largest cities. Bearing in mind that construction, as well as operating, costs have greatly increased since that time, we should expect similar figures for today at nearly double those figures, and such a result is indicated at page 611 of the 1925 Manual of Water Works Practice; in the amounts of $3.00 per capita in small cities and towns, $2.00 in average cities, and $1.25 per capita for larger cities.

Private Fire Protection

The Committee report on private fire protection service from the 1919 A. W. W. A. *Journal* provides a logical and definite method for apportionment of the burden in keeping with the costs created by demand service to the result of a rate schedule containing a service charge intended to cover both capacity costs and customer costs, with conclusions of the Committee, as follows:

"With such a system of rates established, it is simple to see that one who required a large service connection and little or no water will pay only the fixed charge, whereas one who requires a small service connection and a steady supply of water will pay for the bulk of his service through the proportional charges. . . . It is also simple to see that the charge which will be made for fire protection service under such a system of rates will be the fixed service charge, which will be the same as would be charged for any other connection of the same size without distinction or *discrimination* on account of the purpose for which the connection is desired."

W. E. Miller, of the Committee, appears to partially take the same view of the matter as expressed in the paper of Metcalf and colleagues, to the effect that connections for sprinkler systems and other special equipment on the premises of the customer create an actual decrease in the burden of fire protection service, rather than an increase, and therefore should not be penalized by any charge whatsoever in excess of the charge for public fire protection; although the report of the Committee takes a clear stand that a proper service charge for the size of the service connection should apply for service connections to private fire protection equipment of any sort, including automatic sprinkler systems.

The conclusion appears sound that discrimination would exist if private fire service were rendered without charge to the individual, for the reason that the existence of this community water service and a connection therefrom to the customer's private plant creates a material benefit and saving to him as added protection and lower insurance rates, and for that reason alone he should contribute something to this community undertaking. Entirely aside from the saving to said individual, however, some expense is incurred by the utility from the attention required for inspection, for maintenance, and care against false usage; by the hazard of so large a connection and the experience of occasional broken lines leading from such service connections. It is often the case, however, that a lesser, or modified, rate is applied to private fire protection service, as against public fire protection, at a minimum rate of a certain figure for each hose attachment and a certain

FIGURE 7

COMPUTED REVENUE—BY PRESENT WATER RATES FOR FULLY METERED SERVICE AND ON PRESENT BASIS OF FREE SERVICE TO SCHOOLS, CHURCHES, AND CITY

Range in Hundred Cu. Ft. per Month	Number of Meters	Hundred Cu. Ft. Per Mo.	Cubic Feet per Block of the Schedule: 1st Blk.	2nd	3rd	4th	5th	6th
0 — 10	3,255	12,168	12,168	....	....	....	....	....
10 — 25	228	3,588	2,280	1,308	....	....	....	....
25 — 40	44	1,405	440	660	305	....	....	....
40 — 55	16	766	160	240	240	126	....	....
55 — 80	12	772	120	180	180	180	112	....
Over 80	30	9,261	300	450	450	450	750	6,861
Totals..	3,585	27,960	15,468	2,838	1,175	756	852	6,861
Gain by minimum charge on 2304 =			5,469					
			20,937					
Water rates.....			20¢	15¢	12¢	10¢	8¢	6¢
Revenues.....			$4,187.40	$425.70	$141.00	$75.60	$68.96	$411.66

Charges per month..... $5,310.32
Charges per year..... 63,723.84 — (Before meter rental)
Add $1.80 on 3,585 meters.... 6,453.00 — As meter rental
A total of..... $70,176.84 = *Computed annual water charges on a completely metered basis*

FIGURE 8

ANNUAL REVENUE FROM SAMPLE METER RATES AS APPLIED TO BILLS FOR 12 MONTHS ENDING JUNE 30, 1928, AND TO METERS AS OF JUNE 30, 1928

Range (Million Gallons per Month)	Number of Bills	Totals	Annual Sales in Thousand Gallons First Block	Second Block	Third Block	Fourth Block	Fifth Block	Total Metered Revenue
0– 10	91,174	269,590	269,590	.....	.....	.....	.....	.....
10– 110	6,263	147,436	62,630	84,806	.....	.....	.....	.....
110– 1,110	679	323,260	6,790	67,900	248,570	.....	.....	.....
1,110–11,110	133	508,837	1,330	13,300	133,000	361,207	.....	.....
Over 11,110	24	355,067	240	2,400	24,000	240,000	88,427	.....
		1,604,190	340,580	168,406	405,570	601,207	88,427	.....
Gain by 1-M minimum per month, adjusted to June 30, 1928		10,000	10,000					
6,663		6,663	6,663					
			357,243					
Sample tariff No. 3:		Service						
Rates		charge	40¢	20¢	15¢	10¢	8¢	
Revenue		$95,410	$142,897	$33,681	$60,835	$60,120	$7,074	$400,017

figure of, say, 5 cents per sprinkler head per year, as well as a modified rate for the size of service connection.

Transfer from Rated to Metered Service

The most delicate problem in the meterization of a complete water service heretofore served on a flat-rate basis is the quantity of water which will be taken through the several services after the charges have been placed on a measured basis. The one important purpose of meterization is the anticipated reduction in usage and pumpage when all service is paid for on an equitable basis rather than on the basis of charges which have no relation whatsoever to the amount of water drawn through a particular service line.

The popular consumption of water throughout the country approaches 100 gallons per day per meter, as borne out by adequate statistics, or from years of experience. Statistics compiled by the Committee on Meter Rates, December, 1916, issue of the *Journal* of the New England Water Works Association, shows the average quantity for ⅝-inch meters in ten or twelve systems as about 116 gallons per meter per day, although 25 per cent of the meters show less than half that amount, and approximately 30 per cent of the total services approximate an average of 50 gallons per meter per day; which in turn means less than 20,000 gallons per meter per year.

The solution of this problem requires a classification of probable consumption by all consumers when placed on metered services, and Figure 7 gives an approximate classification, although extreme caution was not provided in this particular example.

By plotting the percentage of metered consumers taking less than specified amounts of water per year, it is possible to produce a reasonable classification for the particular case being studied. Care is required, however, in the development of a classification from existing meters under proposedly similar conditions where the community is only partly metered. The error would arise from the fact that partially metered systems seldom, if ever, have meters placed on very small users until toward the end of the metering program, and it may be anticipated that the curve characteristic would move to the right and upward as the metering program continues toward completion.

Figure 8 shows a condensed computation for annual revenues from the actual consumption, by an arrangement according to the blocks in the meter rate schedule. Meterage of the commercial district had not yet reached sufficient proportions to prove out the estimated revenues from service charges; and until all large service is metered the gross revenue will remain in doubt; although some evidence is at hand that a reduction in meter sizes on industry (to realize a reduction in service charges) will show a revenue from all service charges somewhat under the preliminary estimate.

The reduction in pumpage, due to metering, will also be found to vary with the local circumstances, and experience of the writer has indicated reductions up to 50 per cent of the previous pumpage where excessive wastage and leakage from customers' plumbing was permitted.

ACKNOWLEDGMENT.—Abstract of a paper presented before the Kentucky-Tennessee Section of the American Water Works Association.

K.I.R.A.—Kalamazoo's Working Model of N.I.R.A.

IN the face of difficult conditions, the civic authorities of Kalamazoo, Mich., at the suggestion of City Manager Edward C. Rutz, followed the dictates of constructive economy, decided that money might better be spent for a dividend-paying investment than for non-dividend-paying relief, and instituted a public works program of their own. In other words, without waiting for the Administration at Washington to distribute the cards for the New Deal, Kalamazoo seized its own deck, and dealt an individual hand of industrial recovery solitaire.

The city's street-car system had been supplanted by busses, and the rails, crisscrossing the town, no longer served a useful purpose. They prevented proper paving, increased the skidding hazard, and were in all ways undesirable. But—they provided the means for Kalamazoo's industrial recovery. The city instituted public works activities, tearing up these rails, which gave employment to much of the labor previously on relief rolls. This alone was helpful, but, as is usually the case, it led to additional benefits.

The municipal power house is located only a few hundred feet from the state highway from which the tracks were being removed. The desirability of an underground conduit system which would house street-lighting, power service, traffic and other municipal signaling cables, had been at all times obvious to the engineers, to Earl E. Norman, Director of the Department of Public Utilities, and to the City Manager. If it had been necessary to open the paving and afterwards replace it, it would have cost about $35,000 to install the underground conduit. By taking advantage of the fact that the pavement was already opened by the tearing-up of the trolley rails, the project could be handled for about $19,000.

Here was a job that would immediately effect savings in operation and maintenance costs; that would be a permanent improvement. On the other hand, there was the prospect of paying out at least half of the $19,000—$9,500—for direct relief to the men who, if the underground project went through, would actually earn their living. The fact that a $35,000 improvement could be obtained for only $9,500 more than would have to be spent in any case, was a potent argument with the City Commissioners.

The benefits did not stop with the original workmen: there are a number of men producing materials and equipment behind every workman on any construction project. Take just one item—the Natco clay conduit which was installed: 98 men worked 8 days on the various processes from the raw clay to the proved conduit. Everybody in the whole railroad organization benefited in some degree from the shipment of this one order. The dollars spent went, in turn, to landlords, grocers, bakers, merchants and others.

This is a gratifying object lesson on the benefits that municipalities may realize by taking immediate steps to improve conditions in their own areas, instead of waiting for the benefits of the national plan to filter down to them.

L. M. CHRISTIE,
Vice-President, National Fireproofing Corporation.

A New England Town Hall Which Fits Its Surroundings

By S. M. NEAL

CONFORMING to the elegance which distinguishes the architecture of the last quarter of the eighteenth century, the new Town Hall of Longmeadow, Mass., gracefully fits into its pre-Revolutionary background. It stands near the large green around which the early village was built, by the side of which are several Colonial houses. Across the street are the white meeting-house and the 1716 burying-ground. Not only does the Town Hall "belong" in this historic scene with its centuries-old trees, but it also meets the need for a modern, well-equipped municipal building.

The construction is of hand-made, water-struck brick over a steel design of columns and beams, with concrete floors. It was adapted from the pre-Revolutionary Marchant Colton residence, the original door of which is now in the Fine Arts Museum, Boston. In the lower half of the doors are witches' crosses, and at the sides of the doors beautifully carved pilasters. Over the lintel is a decorative head featuring the broken pediment, rosettes and flame finial. Semi-circular walks and three-tiered, broad brownstone steps, duplicates of originals quarried in the town, lead to the doorway.

As one approaches, it is noted how successfully the building is tied into its setting by the evergreen and native forest trees which form the backdrop of the scene. Gleaming against the evergreens stands the flagpole and stone exedra, a memorial to Longmeadow's World War veterans.

The architect, Morris W. Maloney, of Springfield, Mass., has continued the Colonial atmosphere in the design and finish of the Selectmen's Room on the first floor and the Hearing Room on the second floor. There are heavy-beamed ceilings, with smoky plaster, knotty pine paneled walls, wide fireplaces, wrought-iron Colonial lighting fixtures, fine trestle tables, interesting Windsor chairs, and ladder-back chairs, and window draperies of chintz in old patterns.

A variety of rooms and offices are devoted to the business of the town, including a complete police department. The public office of the town clerk and treasurer has a modern low bank screen in knotty pine paneling, to combine the elegance of the period of design with modern business efficiency. Wrought-iron railings have been introduced judiciously into the interior, and all the lighting fixtures in the special rooms and the lobby were designed and manufactured from details furnished by the architect.

THE NEW TOWN HALL OF LONGMEADOW, MASS.

Showing the memorial flagpole and stone exedra. The forest trees and evergreens, and the shrubbery planting, in which Mrs. John Jennings, landscape architect, of Longmeadow, assisted, are gracious and beautiful features of the building's setting. Note the curving walk, and the Palladian window on the third floor at the end of the building

The Effect of Metering on Water Consumption and Water Costs

By **E. B. LLOYD**
Chief Engineer,
Water Department,
Elgin, Ill.

THE Elgin water works began furnishing water to the community in 1888, at which time the city's population was 16,000. There were only 317 water consumers, 31 of whom were metered; the rest were on a flat-rate basis. At that time meter users were required to pay a minimum of $15 a year, and "any person taking water for any purpose, however small" paid a minimum of $6 per year. The meter rates ranged from 3 cents per 100 gallons to less than 1 cent per 100 gallons for amounts above 5,000 gallons. The flat or annual rates ranged from $15 for industrial and commercial establishments down to $6 for a 6-room dwelling occupied by one family. Extra charges were made on a square-foot basis for sprinkling lawns, sidewalks, etc., four hours per day from April 1 to November 1.

The rate of pumping grew very rapidly until 1904, when it reached an apparent average of 2.6 million gallons daily. At about that time the universal metering system had been adopted, and from then until about 1915 the pumpage decreased to an average of 1.133 million gallons daily, with the water revenue derived practically 100 per cent from meter rates. The actual figures were $46,162.88 from meter rates and $290.32 from flat rates.

From 1915 to 1919 the rate of pumpage increased in proportion to the increase in population, but a greater increase in pumpage was recorded in 1920 and 1921. It is believed that this record is at fault, the output of several new wells having apparently been estimated from original test rates. One well which was rated at 1 million gallons daily or more was found to be producing less than 130 gallons per minute at an annual cost of about $12,000. The actual average daily pumpage in 1920 is believed to have been about 1.65 million gallons daily.

The water revenue was derived 100 per cent from metering from 1915 to 1919, but from that time on, to the present year, from 5 to 9 per cent has been derived from hydrant rental from the corporate fund at the rate of $10 per hydrant per year. In 1932 the revenue was 100 per cent from meter rates, for the hydrant rental was not paid, owing to a shortage in the corporate fund. A 20 per cent reduction in assessed valuation of real estate correspondingly reduced the income from taxation.

Metering Saved Pumping

In 1900, when the population of Elgin was 22,433, 26 per cent of the services were metered, the average daily pumpage per capita was 77.2 gallons, and the annual revenue per capita was $1.24. In 1910 the population was 25,976. The services were 73.8 per cent metered, the average daily pumpage was 80.3 gallons per capita, and the income per capita was $1.79 for the year. In 1920, population 27,454, services 91 per cent metered, the average daily pumpage was 84.8 per capita, or 60 gallons as corrected as noted above, and the income $2.21 per capita. In 1930, population 35,900, services 94.3 per cent metered, the per capita pumpage was 63 gallons and the income $3.21 per capita. In 1932, with a population of 36,000, the system was 99 per cent metered, the average daily pumpage 52.9 gallons per capita, and the income $2.70 per capita. These figures seem to indicate that metering is at least partly responsible for a 170 per cent increase in per capita water revenue with only a 52 per cent increase in population, and a 37 per cent increase in pumpage in the corresponding period of time 1900 to 1930. This increase in pumping, however, shows an actual 18 per cent decrease in per capita pumpage; in other words, there was an apparent huge increase in per capita revenue, with a marked decrease in per capita pumpage. In 1932 there was another decrease in pumpage, the daily average being 1.9 million gallons, or 52.9 gallons per capita, but the revenue was also somewhat lower. The depression has brought delinquent accounts up to almost 30 per cent of annual revenue.

Meter Maintenance

In the spring of 1931 it was found that about 20 per cent of the meters were in need of repair or adjustment, there being about 2,000 which were non-registering. At the present time, under a strict maintenance system, less than 2 per cent are in need of attention, and these will have been repaired or replaced within two months.

A Comparison of Flat and Metered Revenue

The following figures are taken from the 1906 and 1907 annual reports of the Department and show in an interesting manner the benefits of metering:

Received from flat rates, 1906	$28,343.33
Received from flat rates, 1907	26,911.18
Loss in flat rates, 1907	1,432.15
Received from meter rates, 1907	18,597.06
Received from meter rates, 1906	10,475.51
Gain in meter rates over 1906	8,121.55
Deducting from this the loss in flat rates	1,432.15
Shows net gain of	6,689.40

Meter Rates

The meter rates given below have been maintained for the past ten years and are all subject to a 5 per cent discount for payment within 15 days:

$1.50 per quarter for 1st 700 cubic feet or less
.16 per 100 cubic feet for next 2,600 cubic feet or less
.15 per 100 cubic feet for next 4,600 cubic feet or less
.13 per 100 cubic feet for next 8,000 cubic feet or less
.11 per 100 cubic feet for next 12,000 cubic feet or less
.07 per 100 cubic feet for all above 28,000 cubic feet.

Snow Removal in the Winter of 1933-34

Hand Labor to Relieve Unemployment, or Machines to Aid Re-Employment?

OLD-FASHIONED winters have not been as prevalent in the snow belt in the last few years as they were ten or twenty years ago. Certain sections, notably southeastern Massachusetts, some parts of New Hampshire and a few restricted areas of the Middle West, experienced heavy snowfalls last winter, but in general light snowfalls were the rule, and these were handled readily by hand shoveling into trucks.

The snow-removal problem of 1933-34 seems to have several features. Of course, there is always the gamble whether there will or will not be a heavy snowfall generally throughout the snow belt. Cities have played for little snow over a period of years and have come through unscathed, for the entire country has experienced a period of higher average temperatures and lower average precipitation. Assuming, however, that this condition is definitely changing, and meteorologists agree generally that it is, just what plans should cities make for snow removal during the coming season?

This brings us to the second part of the problem. Should snow removal this coming winter be considered as "welfare work"? In sections of the country visited late this summer, there is already a scarcity of labor. The unemployment lists are practically zero, since mills have re-opened and many young men have been transported into the Civilian Conservation Corps. Highway contractors in these sections have found it difficult to secure sufficient labor to operate under the 30-hour Federal regulation. With the increased effectiveness of the National Recovery Act, each week there will be less and less unemployment in our cities and manufacturing centers generally, and it is reasonably expected that bread lines and doles will be much less necessary this coming winter for those who are willing to work.

Snow removal, where it has been necessary, for many years has been considered an excellent means of unemployment relief among able-bodied men through hand loading of trucks and pushing snow in street-cleaning pans or scrapers to manholes over large sewers. With the small snowfalls that have been experienced, this method has been reasonably satisfactory, for it has usually been the case that most of the snow melted before it could be removed by the slow processes of hand labor. With the rapid lowering of the reservoirs of unemployed labor which might be used in this work, a real blizzard might cause serious traffic tie-ups in some of our larger cities, to say nothing of the smaller communities. Many cities still have their old complement of tractors and heavy trucks with pusher blades which can be put into service. Many of these have not been used for a number of years and will require complete overhauling. This will provide employment for skilled mechanics and prove a boon to that class of high-grade labor. Cities should consider carefully the need of purchasing mechanical equipment for snow removal and should realize that skilled labor has been given employment in the production of every machine bought.

Closely allied to this discussion is an editorial which appeared recently in the New York *Sun*:

"One of the important benefits of the entire public works program is supposed to be the business it will give to industries that make supplies for building jobs. It has been our view that when the highway program is carried out, all over the nation, it will employ more men in industry than in actual construction. It will require thousands of tons of cement, explosives, crushed stone, gravel, fuel, sand, asphalt, brick and wire. If Mr. Ickes' policy of giving preference to men rather than to machinery is to be applied consistently, then the factories which make these building supplies should shut down some of their machines if their operations can be done by hand labor.

"What will the machinery makers say about this idea? Maybe they will begin to believe that Secretary Ickes is a Technocrat or some other kind of a faddist. If labor is to be substituted for machines on public works projects all over the nation wherever such a step may seem practical to the local board, what will happen to employment in machine shops? What will the steel industry say when it learns that its partner in Washington has advocated something which may lead to a drop in the demand for iron and steel?"

Thus with the resumption of employment for hundreds of thousands of men through industry which has been stimulated by confidence in the New Deal, city officials must turn their thoughts to the employment of machinery once again for their snow-removal, street-cleaning and street-maintenance problems.

Clearing the streets of New York City after a winter storm is a necessity which arises from the peculiar layout of the municipality. Although the task was performed last winter in considerable measure by hand labor in order to

help those financially distressed, it was done chiefly to save the heavy losses to business which would otherwise have developed.

The Organization of Snow-Removal Labor Last Winter in New York City

The average number of street cleaners that are regularly employed by the Department of Sanitation of New York City is 12,000. It is economically impossible to maintain a force large enough to clear away sudden falls of snow, especially in this climate, where it is becoming more and more difficult to foretell what the winter may bring forth. In August the plans were mapped out and the Board of Estimate and Apportionment, sweltering in summer heat, voted revenue bonds for hiring extra laborers to clear away the snows of winter.

All the year round, this skeleton snow army is drilled and trained. Alert foremen are sent to a special school where they are instructed in all the details of snow removal. New machines are bought and old ones repaired; plows, trucks, scrapers and flushers are inspected and stored awaiting the mobilization call. Signs appear in September and even in August on the trucks of the Department of Sanitation giving notice that extra laborers are wanted for snow removal. Applicants for the work register at the sixty-four stations of the Street Cleaning Division. They make up the nucleus of the extra force. Men not registered may be taken on if the enrolled helpers do not respond promptly when the need comes.

The radio proved an effective ally in broadcasting the call for helpers. This idea of sending a call for snow shovelers by air would have seemed a surprising stunt even a year or two ago. Many of the recruits were within reach of the radio, however. Hundreds of men who through the stress have kept up homes or live in lodgings where the microphone is heard, turned out at midnight after hearing the aerial summons and joined the long lines at the appointed places. The additional force hired last winter by the Street Cleaning Division of New York City numbered from 18,000 to 19,000 men, which, combined with the regular employees, made up 30,000 men available for the rough clearing and piling of the snow.

A heavy snowstorm costs the city of New York from $1,000,000 to $1,500,000 for extra labor. What the city actually pays, counting the work of the regular personnel and the wear and tear on about 1,500 pieces of apparatus, is difficult to estimate. To meet the expense, the municipality issues special revenue bonds. The amount of money spent for snow removal depends largely on what the sun and rain do to clear the streets. The bill becomes larger if there is a thaw followed by freezing. Then a pickaxe brigade must be organized.

Hand shoveling and the use of some plows easily removed the snowfalls of last winter to the sides of the streets, and much of the snow was loaded onto trucks by a group of large mechanical loaders developed especially for this work.

Elevated Steel Water Tank Houses Complete Aeration System

THE elevated steel water tank recently completed for the village of Garden City, L. I., by McClintic-Marshall Corporation contains a complete aeration system. This innovation in water-tank construction consists of a series of trays suspended from the roof trusses in such manner that all incoming water is cascaded over the trays before it enters the storage space. A large ventilator in the top of the tank and ventilator openings in the upper part of the roof are provided for the intake of air and the discharge of air and gases after aeration. A special aviation obstacle light is installed on the roof as a warning to airplanes from two nearby aviation fields.

This tank, which supplies the Garden City water system, has a storage capacity of 1,000,000 gallons, part of which is in its dome-shaped roof. The tank is 67 feet in diameter, and is supported by a 14-column tower, 100 feet in height. The tower is constructed of structural shapes without the use of lattices. A stairway built around the 9-foot diameter riser pipe connects with a walkway extending from beneath the bottom of the tank to the outside of the tower, then mounts to the lower balcony.

The entire roof is made of copper-bearing steel plates, with copper-bearing rivets. Two 2-inch wrought-iron galvanized pipes supply the line for purification of the water. The inlet and outlet pipes are 20 inches in diameter; and the blow-off and overflow pipes are 6-inch. The range in head of 46 feet causes a pressure variation in the mains of less than 20 pounds.

Incoming Water Cascades over Trays Before Entering Storage Space

THE NEW ELEVATED STEEL STORAGE TANK OF THE GARDEN CITY, L. I., WATER WORKS

A Sand-Clay Base for a Brick Pavement

By JOHN H. LOWE
County Engineer,
Dougherty County, Albany, Ga.

PRACTICALLY all bases in use today for various types of paving, with the exception of concrete bases, are of the flexible type. It is felt that altogether too much dependence has been placed on a thin concrete slab laid on a questionable foundation. Concrete is an excellent material when used in a properly designed structure, but when a thin slab of concrete, even of the highest type, is laid on a foundation of doubtful character, serious failures are bound to follow. The slab strength is limited and traffic loads are increasing every day. Highway and paving engineers must give more attention to proper foundations under all types of pavements. If this is done, a rigid base is not necessary.

Flexible bases have certain advantages over rigid bases. They present to traffic a surface which has sufficient elasticity to ease the shock to the vehicle as well as the passengers and the surface course. At the same time, this base has sufficient resiliency to resume its original shape and position. Flexible bases are easy and cheap to repair in case of foundation failures, and a great many types of flexible bases are easily salvaged. Repairs can be readily made to flexible bases, for there is no waiting for setting, and the roads do not have to be closed for long periods, necessitating objectionable detours. The original cost of flexible bases is less than the rigid type. Further, most flexible types are not subject to cracking, which permits openings for surface or capillary water, or, as in the case of a brick top, a leaking-away of the sand cushion into these cracks and thereby causing a sagging of the brick surface. Many types of flexible bases are not injured by freezing, and thereby frost heaves are prevented.

Types of Flexible Bases

Types of flexible bases range from natural earth through sand-clay, gravel, clay-gravel, lime rock and on up to the more expensive types of tar and asphalt mixtures. The sand-clay type of flexible base will be considered in this paper.

Dougherty County, like many other counties in Georgia, has excellent road-building material available at merely the expense of hauling. The clays are unusually good, and the sand deposits are in many cases of a sufficiently coarse character for sand-clay mixtures. With these cheap materials at hand, it was decided to build a 5-mile brick job with this type of base.

The road to be paved was an old one, and to close it to traffic would have involved a long and objectionable detour. All fills were made in layers of not over 18 inches, and all the material was hauled in trucks over the freshly placed fill. This made possible the use of trucks for haulage, as well as the usual traffic on the road to compact the fill. The top 2 feet of all the fills was made of selected materials when necessary, and in all cuts where doubtful material was encountered the material was removed to a depth of 18 inches and replaced by selected material. All necessary drainage was placed, and the finished grade of the road throughout was well above the water line at all low places. The stretch of road which has been most recently paved was open to traffic for more than a year before the paving was placed, and held up well under all weather conditions, with no failures.

The final paving is brick on the sand-clay base, 18 feet wide between 5 x 12-inch headers. The brick were 2½-inch vertical fiber, vitrified brick, laid on a compacted 6-inch sand-clay base which had received a tar prime before a ¾-inch sand cushion was placed. The joints between the brick were filled with asphalt having a penetration of 30 to 40.

Preparing the Base

Before starting the base, numerous tests were made of both the clay and sand borrow-pits; also, many experiments were made with different mixtures of sand and clay, with the result that the final mixture contained not less than 10 nor more than 13 per cent clay. The materials from the different borrow-pits were placed on the road and measured by means of side boards and templates striking each material off at the proper depth to get the desired proportions, with the sand placed at the bottom. The materials were then mixed by plowing and harrowing until tests showed the desired uniformity. In most cases the materials from borrow-pits contained sufficient moisture, but in cases where necessary, water was added from a road sprinkler. The road was then brought to a true surface with a road machine or motor patrol and opened to traffic.

It was found that after the material had partially set and the surface dried out, no machining could be done except immediately after a rain or after the whole surface had been thoroughly sprinkled. This precaution is necessary to prevent scabbing, that is the peeling-off of thin laminations on the surface of the road.

Preparation for Laying Brick

After the base was completed and had set up under traffic, the concrete headers were built to hold the brick at the outer edges of the road. The forms for these were built of 3 x 6-inch dressed plank, spiked in to the base and 5 inches apart, with 12-inch round spikes. The planks were drilled for the spikes at 8-foot spacings. These planks were used over and over, and were removed as soon as the concrete had set up. After the 3 x 6 plank had been trued up to the correct height, the material between them was removed with special spades to a depth of 12 inches below the top of the plank. The concrete was then poured, leaving contraction joints every 10 feet and expansion joints every 100 feet.

Upon the completion of the headers, the surface of the road was trued up to the proper depth and approximate crown of the finished surface of the brick. Then the tar prime was applied in the usual manner, and time was allowed for it to penetrate the sand-clay base. The sand used in the cushion contained about 5 per cent of clay. This was brought to a true surface about 1 inch thick by

means of a template of the same crown as the finished road, and then compacted with a light hand roller. The rolled surface was then brought to a true section with a template, leaving the cushion ¾-inch thick. On this sand-clay cushion the brick were laid in the usual manner. After the brick were culled, the surface was rolled with a 3-ton roller until it was true and no variation of more than ¼-inch in 10 feet was found. All spaces between the brick were then filled with asphalt, and the surface was covered lightly with sand.

ACKNOWLEDGEMENT.—From a paper presented before the annual convention of the National Paving Brick Association.

Electricity Supplied at a Good Profit

By **FRED K. VANCE**
Superintendent, Light and Water Department, Neodesha, Kans.

DURING the many years that the city of Neodesha, Kans., has provided its utilities of electricity, water and gas, ample time has elapsed to judge of the success or failure of municipal ownership in this city with a population under 5,000 and with a load that is largely domestic. The population of Neodesha reached a maximum of 4,100 about five years ago. This has now decreased to about 3,500 owing to the decline in oil production and the abandoning of Neodesha as a railroad division point.

Steam Units Replaced with Diesels

Neodesha's water and electric plant started with the purchase of a small steam pumping station from a local oil refinery. In 1910 there was a demand for electric service and it was decided to incorporate both services into a single plant. The pumping equipment consisted of reciprocating steam pumps, which were later replaced with motor-driven centrifugals. The two electric generating units were of the Corliss type of 125 and 250 kw. capacity. When installed, they were considered modern and in keeping with the general practice with plants of this size.

It had become apparent, however, with the increased cost of fuel and the necessity for reducing the cost of power production, that either greater efficiency in steam plant operation would have to be secured or more efficient power units would have to be installed. Faced with this problem, the city made an investigation as to the possibilities of the diesel engine. As a result it was decided early in 1922 to install two 550-horsepower Nordberg diesel engines direct-connected to 375-kw., 2,300-volt generators. To house these two new units, an extension 35 feet in length and 43 feet in width was added to the front of the steam plant. This building was of substantial brick and steel construction, and could be enlarged without marring its appearance. The old steam equipment was sold, the foundations were removed and a floor was put in. This cleared space now provides ample room for future units and for supply storage and workshop.

The advantages of the diesel engines became apparent immediately after they were put into service. During the latter part of 1922, the kilowatt-hour cost for the steam plant was 4.69 cents, while the next year with diesel engines this was reduced to 1.26 cents. In 1930, with a production of 2,226,820 kwhr., the unit cost had been reduced to 0.884 cents per kwhr., or less than one-fifth of that produced by steam equipment in 1922.

As in many city-owned plants where the load is largely domestic, the load factor is somewhat unfavorable for attaining low power costs. Ordinarily, only one diesel unit is required and is then only fairly loaded even during the evening hours. The rest of the time the load is comparatively light. A local oil refinery takes considerable load at times, but the demand is rather intermittent. With a substantial increase in power load, a considerable improvement in operating profits could be shown.

The following table gives the nine-year record of production and profits:

Year	Kwhrs. Produced	Kwhrs. Free City Service	Revenue	Production Cost	Operating Profit
1924.....	1,362,700	650,248	$34,000	$21,000	$13,000
1925.....	1,599,100	564,750	35,000	23,000	12,000
1926.....	1,989,200	728,315	45,200	26,628	18,572
1927.....	2,065,800	648,200	48,451	33,551	14,900
1928.....	2,022,430	650,412	49,780	24,780	15,000
1929.....	2,106,800	610,740	52,463	27,249	25,214
1930.....	2,216,820	615,417	52,110	24,954	27,156
1931.....	2,328,239	805,059	55,220	20,596	34,624
1932.....	1,817,000	742,900	45,987	16,526	29,461
Total....	17,508,089	6,016,041	$418,211	$218,284	$189,027

Production cost includes generating, distributing and miscellaneous expenses.

An analysis of these figures shows that 34.3 per cent of the current produced is used by the various city departments, including street lighting, water pumping, sewage disposal, and the lighting of the library and other city buildings. In the column of "Revenue," no credit is given to the power plant for this city-used current, which is furnished free.

For the nine years, a total of 6,016,041 kwhrs., if purchased at the reasonable rate of 1.5 cents, would have amounted to a total of $91,140.61, or $10,126.75 per year, or more than the annual interest charges on the bonded indebtedness of the light plant. If credit were given for this free service, the light plant profits would be considerably increased. By furnishing this service without cost, the city is relieved of a big item of expense that ordinarily would have to be borne by taxation. With the abundance of low-cost current available, greater use is made of electric service. The growth that has been made in load is largely due to the present-day tendency toward the greater use of electricity when supplied dependably and at reasonable rates. There has been no material increase in power load from industry, as in some municipalities.

Neodesha claims to be one of the best-lighted towns in Kansas. In 1922, prior to the installation of the diesel engines, there were 47 street lamps. The next year, the number had increased to 147, and in addition there were 22 alley lights installed and a whiteway of 106 lamps. In 1930, the street and alley lights totaled 381, all being of 250 candlepower. It is a safe assumption that, had it been necessary to purchase this amount of lighting at normal rates, Neodesha would not bear the reputation of being an unusually well-lighted city.

The engineering details of the power plant here presented were prepared in the office of Black & Veatch, consulting engineers, of Kansas City, Mo.

Garbage and Rubbish Disposal in Minneapolis, Minn.

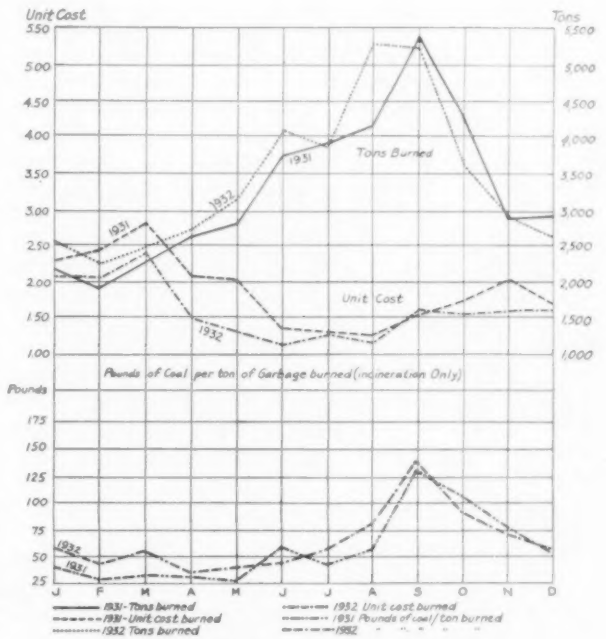
THE Sanitation Department of the city of Minneapolis, Minn., is entrusted with the collection and disposal of household garbage and burnable rubbish. The regulations require that all garbage be wrapped in paper by the householder and placed in suitable galvanized iron pans near the alley or in other accessible places on the property. Collections are made one each week throughout the year by city forces. The equipment for garbage collection includes thirty-nine 1½-ton trucks, one Ford service truck, three 5-ton tractors with 10 semi-trailers, and two hundred steel garbage tanks of 100 cubic feet capacity each, which are demountable from the truck platforms.

Each truck has a crew of three men, composed of the driver and two loaders. Collections from the south and west sections of the city are hauled to the transfer station, at which point the tanks with their contents are transferred by crane from the trucks to the large semi-trailers, which hold six tanks. The semi-trailers are hauled by the 5-ton truck tractor to the Riverside destructor. Collections from the north and east sections of the city are hauled direct to the destructor plant.

Destruction of Refuse

All garbage and rubbish received at the Riverside destructor is reduced to a mineral ash in three high-temperature Minneapolis design furnaces of a nominal capacity of 100 tons each per 24 hours. The garbage and refuse burned contains from 65 to 90 per cent moisture and has a heat value of about 2,000 B.t.u. per pound, and therefore requires some additional fuel to properly reduce it to a mineral ash.

Table 1 shows the amount of collection for the years 1925 through 1932. The money to pay for this work is raised by the general tax levy. Table 2 shows the operating costs of the Sanitation Department, dividing the cost into collection and destruction.



1931-1932 OPERATION CHART OF THE MINNEAPOLIS GARBAGE INCINERATION DIVISION

TABLE 1—GARBAGE AND RUBBISH COLLECTION

Month	1925 Tons	1926 Tons	1927 Tons	1928 Tons	1929 Tons	1930 Tons	1931 Tons	1932 Tons
January	1,788.89	1,723.33	1,345.87	1,484.82	1,698	..,007	2,343	2,487
February	1,444.52	1,397.88	1,296.32	1,210.82	1,287	1,685	2,020	2,231
March	1,710.74	1,469.68	1,754.38	1,345.47	1,516	1,862	2,434	2,435
April	2,234.15	1,804.41	1,792.74	1,595.68	2,049	2,124	2,690	2,717
May	2,398.63	2,196.95	2,175.69	2,251.90	2,348	2,689	2,773	3,122
June	3,241.88	2,870.20	2,876.81	2,926.18	3,085	3,219	3,822	4,015
July	3,473.29	3,188.78	2,960.34	3,349.94	3,568	3,659	3,882	3,813
August	3,608.49	3,924.25	3,382.14	4,518.01	4,085	3,874	4,279	5,249
September	4,018.63	4,408.81	4,076.70	4,218.85	4,074	4,229	5,487	5,231
Octooer	2,606.24	2,747.67	2,720.82	3,172.96	3,045	3,197	4,164	3,613
November	1,830.63	1,966.70	1,972.34	2,097.18	2,065	2,295	2,885	2,865
December	1,899.91	1,794.85	1,433.98	1,629.67	1,967	2,448	2,931	2,612
	30,256.00	29,493.51	27,935.93	30,041.50	30,757	33,288	39,710	40,390

TABLE 2—OPERATION COSTS, SANITATION DEPARTMENT, CITY OF MINNEAPOLIS, 1926-1932

COLLECTION

YEAR	BASE 1926	1927	1928	1929	1930	1931	1932
Total tons	29,493	27,936	30,042	30,757	33,288	39,710	40,390
Total cost, including depreciation	215,434.18	217,365.94	211,138.03	211,783.94	225,207.70	240,417.11	221,764.83
Cost per ton	7.31	7.73	7.03	6.89	6.77	6.05	5.49
Saving, ton unit base		22,531.50	8,411.76	12,917.94	17,975.52	50,034.60	73,509.80
Total saving, 1926 to 1932							$140,318.12

DESTRUCTION

YEAR	BASE 1926[1]	1927	1928	1929[2]	1930[3]	1931	1932
Total tons	26,143	26,053	29,546	29,980	32,220	39,413	40,922
Total cost	86,528.55	86,296.70	78,127.64	83,932.55	71,524.40	70,360.20	63,483.85
Cost per ton	3.31	3.31	2.64	2.80	2.22	1.79	1.55
Saving, ton unit basis		.....	19,795.42	15,289.80	35,119.89	59,907.76	72,022.72
Total saving, 1926 to 1932							$202,135.59
Total saving—collection and destruction							$342,453.71

[1]1926—Riverside Destructor in service—Goder furnaces, No. 1, 2, and 3.
[2]1929—Riverside Destructor No. 3 Furnace—Minneapolis furnace, replacement.
[3]1930—Riverside Destructor No. 1 and 2 Furnace—Minneapolis furnaces, replacement.

Park and Playground Development—A Present Opportunity

By HARRY TUCKER
Professor of Highway Engineering, North Carolina State College of Agriculture and Engineering

DURING the prosperous years preceding the depression many cities undertook elaborate programs for extending and beautifying their park systems. Some were completed; others never developed beyond the planning stage. With the stringent conditions which now exist in the financial affairs of most of the cities, it is certain that little money will be available for creating and improving the park systems of many municipalities.

It would be unfortunate if those interested in beautifying cities should become discouraged because of these conditions, and abandon plans for park and playground improvement. A system of parks and playgrounds, with units properly located and improved, greatly enhances the appearance of a city and makes it a more attractive and desirable place in which to live. These units also serve a direct utilitarian purpose in affording recreation sites for young people, and especially for children. Interested citizens and officials who are aware of these benefits, instead of being discouraged, should seek to take advantage of certain economic factors now present in many of the cities. If this is done, it will be possible not only to continue programs for the improvement of parks and playgrounds, but even to expand such programs. And this can be accomplished with very slight expenditures of city funds.

It will be necessary to take care of three specific steps in the development of parks if the work is to proceed in an orderly manner. Sites for improvement must be available or it must be possible to acquire them at a very small cost; the proposed work must be carefully planned and laid out; and facilities must be utilized by which the work can be done without the necessity of providing additional city funds for the specific purpose of park improvement. All these things can be accomplished through the exercise of some forethought, and by making use of existing municipal agencies and civic organizations.

Securing Suitable Sites

There are several ways in which suitable sites for the development of parks and playgrounds can be obtained at small cost. It will be found that, in many cases, in the subdivision of property into residential lots, the developers have left certain plats for parks. These can be properly landscaped and planted, and will add to the attractiveness of the section in which they are located. Again, there are, in every city, many pieces of vacant and waste property which owners will be glad to deed to the city for development into recreation centers. Then, too, there will often be property adjacent to public schools, either owned by the city or otherwise available for improvement into playgrounds at a nominal cost.

But cities need not take only those sections of land which are waste or which cannot be used profitably by the owners. There are numerous plats of tax-distressed property in every city, and in many cases the municipality has acquired title to the property through tax sales. Thus, without the actual expenditure of any money, cities can secure much attractively located property for recreation purposes.

Planning and Development

With land acquired, proper planning of the improvement is essential. The engineering department of the city can assist in this work by making the necessary topographic surveys. Able-bodied men who apply for help can be put to work on park projects. The labor will be fairly light, interesting and useful. It will enable the unfortunate man without work to be helped, and at the same time his self-respect will be preserved. It might be pointed out, too, that the services of technical men can be secured in a similar manner, and the planning of the work can be paid for out of the same relief funds. In this way, relief will not be a dole; but the expenditures to aid the unemployed will in reality result in improvements which will be permanent and worth-while.

Why Not Start a Municipal Nursery?

Every city of any size should have a municipal nursery from which plants and shrubs for beautifying parks can be obtained. If there are such nurseries, then the cost of plantings will be very slight. If the city does not have a municipal nursery, the present is a most excellent time to start one. Land can be acquired in one of the several ways suggested, and unemployment relief labor can be used in planting and cultivating young shrubs and flowers.

Playgrounds for children should be suitably equipped. If public funds for apparatus are not available, the residents of a neighborhood in which a playground is located should be urged to assist in providing equipment. This can be done more easily for playgrounds connected with graded schools, since parent-teacher associations are always glad to help in this worth-while endeavor. Frequently merchants will cooperate in providing playground equipment in return for certain advertising rights. Installation of the more costly types of apparatus may, if necessary, be delayed for better times. If the playgrounds are provided, they will be used; and after all, that is the prime object of having parks and playgrounds in a city.

Of course, parks once established and improved must be looked after properly. Under no circumstances must their maintenance be neglected, for they can quickly become eyesores instead of attractive recreation centers. This item need not be a great financial burden upon a city. The same facilities utilized for improving the parks can be used in keeping them well cared-for and attractive.

Not only will a city with beautiful parks be a more attractive place in which to live, but children will be kept out of the streets and their youthful energies directed into wholesome activities. And this is a result certainly worthy of the best thought and efforts of city officials.

Why the Street Trees of Tokyo Excite the Admiration of Visitors

By W. D. POPHAM
Professor of Landscape Architecture,
Iowa State College

THE AKASAKA MIGUKI VICINITY

VISITORS to Tokyo, without exception, express surprise and admiration for the manner in which the city has been rebuilt since the earthquake. For, in those brief years since 1923, a new city has risen phenix-

THE EDO-BASI SECTION
Showing new boulevard through heart of city

like from the ashes of the old; not only a new city, but also a great one, for Tokyo of today is truly a world capital, rather than the obscure provincial city it was before. New buildings of the most modern types have replaced the former hodge-podge of mid-Victorian architectural curiosities, broad, well-paved streets the muddy paths of yesterday, and parks and open spaces dot the city.

SUMIDA PARK, HONJO SIDE
Planted for 3½ miles with flowering cherries

But the one feature which most excites the admiration of visitors is the beautiful street trees. Probably no city in the world at the present time excels Tokyo in the ordered planting and care of its trees. Not content alone with paving its streets, Tokyo also lines them with trees; the street tree planting is considered an integral part of street development and, furthermore, the care does not stop with planting; the trees are beautifully maintained.

The surprising fact of the tree planting is that it has practically all been done since the earthquake. There were in Tokyo before the disaster 24,600 street trees, of which 14,300 were burned, leaving 11,470 only, 120 of which were newly planted, so that it can be seen that most of the street tree planting is of comparatively recent origin. To K. Inoshita, the Director of Parks and Playgrounds of Tokyo, belongs most of the credit for the present system of street tree planting, for among the many other reconstruction duties of Mr. Inoshita was the formulation of a definite street tree policy for the city.

Fortunately, the street tree program was established upon a broad foundation, and not considered, as is often the case, from the standpoint of appearances alone, but, according to Mr. Inoshita, the following points were all carefully studied in the development of the policy:

First, beauty.—All Japanese greatly love Nature, and all its expressions, and to them the beauty of a tree consists not only in its shape and foliage, but also in the expression of its growth, and for this reason tree planting was considered of value in keeping the minds of workers and residents fresh and peaceful.

Second, the sanitary and hygienic values of street trees in keeping the proper balance of humidity, in absorbing the surplus carbon dioxide, and in preventing dust from flying over the city.

Third, the convenience to the public in keeping the city cool in summer, and in providing shade.

Fourth, that the trees serve a certain architectural value in harmonizing both sides of the street where non-uniform buildings exist, thus making the street and buildings more symmetrical and beautiful.

Governmental aid was invoked, and since the earthquake the Government plants street trees along all streets from 12

ken in width (1 ken is approximately 5.96 feet), while on exceptionally wide streets four to six lines of trees might be used. On streets of under 12 ken in width, it was considered undesirable to plant trees. At the inception of the program there were no commercial nurseries handling trees in quantities sufficient for street tree planting, and collected trees proved too irregular in shape and not culturally adapted for planting; therefore, one of the first works of the reconstruction program was the establishment of a municipal street tree nursery. This has been notably successful, and today there are over 38,000 trees ultimately destined for street tree planting growing in these nurseries. The time for the production of street trees suitable for planting has been found to vary from five to twelve years, depending upon the species.

The trees for street tree planting are carefully chosen, and considerable variation is made upon different streets, depending upon local conditions and usage. The following requirements for all street trees have been adopted, and any tree which fails to stand up under these tests is discarded.

First, the tree must be hardy under city conditions, and able to resist gases, bacteria, and other unnatural conditions peculiar to cities.

It must be able to withstand dryness of soil, the sparse amounts of water in paved areas, and also the reflected light of buildings and streets.

It must provide good shade in summer.

It must be of a height, shape and size not to interfere with street traffic or utility wires.

It must be of good shape, regular and uniform in habit.

It must grow rapidly and form a spreading head.

In addition, so far as possible, trees characteristic of the region should be used, and for this reason exotic trees are used sparingly.

In the actual planting operations, the trees are carefully placed so as not to interfere with traffic, utility wires or buildings. A central parking strip, with trees in it, is considered nearly ideal as a location, since here the trees are protected from traffic, relatively free from the shade of overhanging buildings, and out of the way of sidewalk hazards. However, if the street is narrow, planting on either side of the street is the only method available; and in many cases the only available areas are small openings about 4 feet square in the sidewalk, but these are filled with good soil and the trees carefully tended so that they do rather well. The distance apart is usually less than in America, varying from 20 to 40 feet.

All trees are in good condition upon planting, and the planting is carefully done. After planting they are all staked, and after this they are carefully tended, being watered when necessary, pruned, fertilized and cultivated twice a year. Also, careful watch is kept for insect or fungus pests, and immediate attention given whenever any are found. As a result, the trees are all in flourishing condition, well grown and shapely, and a most valuable adjunct to the beauty of the city. In fact, in no other city in the world have I ever seen trees so well cared for as in Tokyo.

The kinds of trees used vary considerably, for an effort is made to vary the planting according to locality, historical association, amount of moisture, etc. Different kinds of trees are never planted on the same street, and some effort is made to vary the plantings in the same locality, such as using ginko for the streets and platanus for avenues.

The following trees have been used for street planting and the observations concern their behavior in Tokyo.

Ginkgo (*Ginkgo biloba*).—This is one of the best street trees for Tokyo, and is especially beloved since the earthquake, for the thick leathery leaves withstood the attacks of fire so much that the inner branches were not injured, and the trees eventually recovered. It is also popularly believed by the common people to spray water upon fires. The ginkgo is not a native tree, but was imported from China by Buddhist priests and thus has a historical significance also. It is a healthy tree, especially resistant to fire, drought and wind, and is, in addition, easily transplanted and maintained. Its worst weakness is that it is susceptible to damage by creosote.

SUMIDA PARK, ASA KUSA SIDE

Sultan's Parasol (*Arphanate aspera*).—A very handsome tree, of tall, upright shape, with a very broad leaf. Its main disadvantage is that insects attack it when young, so that it requires more care until established than some others.

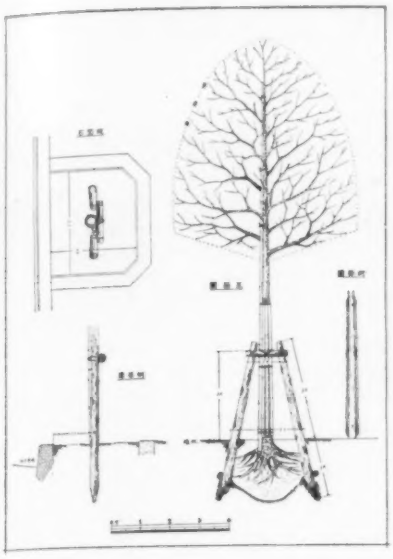
Maple (*Acer mandschurianum*).—A Chinese tree, with good habits and handsome foliage, but usually subject to insect attacks, which renders the tree more or less undesirable, because of the high cost of protection from insect attacks.

SUMIDA PARK, WINTER SCENE

Horse Chestnut (*Aesculus hippocastanum*).—One of the best street trees, an importation from France and much used there. It has very

AKASAKA VICINITY

In both this view and the one above a simple but effective method of bracing in general use for street trees is shown



THE METHOD OF BRACING

This is a reproduction from the Book of Trees by K. Inoshita

handsome broad leaves, and is of good shape. It requires much moisture and therefore should not be used in an extremely dry spot.

Eichyu (Chinese Scholar Tree—Sophora japonica).—A beautiful and shapely trees, with pinnate leaves, very bright and green. Of slow growth, but very resistant to disease and insects, of easy culture and maintenance, and especially desirable because of the ease of shaping the tree to any desired form.

The Red Ash (Fraxinus pennsylvanicum).—A street tree much used in Europe, but in Tokyo regarded as rather inferior, in shape of leaves, growth, disease and insect resistance, to many others tried.

Willow (several sorts).—The willow has been one of the favorite trees in Japan for many years, but it is not held in as much favor as in the past. It will stand much abuse, particularly the disturbance of roots, and, strangely enough, it withstands either extremely dry or wet soil.

The Sakura or Flowering Cherry (Prunus sacchilensis and var.).—A very beautiful tree when in flower; in fact, it is the Japanese state flower, and much venerated by the Japanese. However, it is better suited for an ornamental flowering tree than a street tree, for it is easily infected from slight injury, and is especially subject to root disease. But wherever possible it is planted because of its association and its beauty. The new parkway along the Sumida River has been planted for over three and a half miles with this tree.

The Oriental Plane or Sycamore (Platanus orientalis).—All over the world a favorite street tree, owing to its fast growth, its large leaves, and its resistance to gases and insects, but in Tokyo it is especially subject to a peculiar type of mildew, which forms on the leaves in such quantities as to cause serious inconvenience to passersby. Also, because of its rapid growth it requires more trimming than most trees. The average cost of maintenance of this tree in Tokyo is 80 sen a year (40 cents), which is the highest cost for any street tree.

Tulip Tree (Liriodendron tulipifera).—An American importation and a tree of great beauty and easy growth. It is, however, a poor tree for conditions of excessive heat and dry soil, and in many respects it is better suited for park and lawn than street planting.

The above-listed trees have been extensively tried out in Tokyo and are now accepted for street planting, with reservations as stated. The following trees have been tried and discarded for the reasons given.

The Mizuki ("Water Tree"—species unknown).—A splendid tree of nice shape, rapid growth and handsome leaves, with endurance of unfavorable winds after trimming, but unfortunately weak in dry weather and soil.

Daimyo Oak (Quercus dentata).—A native tree of picturesque and irregular shape, much esteemed by nature lovers, but in cultivation it does not resist cold wind, dry weather, or insect pests.

Cinnamon Tree ("Kajira"—Cinnamomum zeylanica).—Somewhat like the poplar tree in shape and habit, but good for street planting only in moist, cool places; of no value for hot, dry locations.

Nise Akasia—scientific name unknown.—Once thought to be of value in Tokyo, but discarded for street planting because of its tenderness and susceptibility to wind damage.

Zelkova (Zelkova acuminata).—A tree still under experiment, but with several defects, such as inability to withstand reflected heat, difficulty in trimming, and inability to withstand bad air.

Tree of Heaven (Ailanthus glandulosa).—Of some value for very congested districts, but the wood is too soft to withstand conditions.

Linden (various species).—While these trees are extensively used in Europe, Tokyo's climate is unsuited to growing them.

AUTHOR'S NOTE.—This article is compiled largely from a pamphlet entitled "The Street Trees of Tokyo," by K. Inoshita, Superintendent of Public Parks, Tokyo. Translated by James Kay.

Revenue Bonds for Sewerage and Water Supply

A Type of Bonds Which Enables Many Cities to Obtain Federal Funds Without Adding to the Local Tax Burden

PASSAGE of enabling acts by the last Illinois Legislature, in special session, places municipalities of that state as the latest which can now finance construction of sewage-treatment and water-supply systems by means of revenue bonds. To date, 26 states have passed such legislation.

Such state laws enable city councils to authorize construction of sewerage or water-supply systems, to arrange with necessary agencies for loans, to advertise and award contracts for construction, and to make service charges to take care of operating and financing costs. A referendum vote is not required, yet can be held if the council wishes.

Any community is thus enabled to provide for its needed sanitary and water requirements, regardless of ordinary restrictions on its bonded indebtedness. At the same time it does not require those who prefer to use the existing methods to change their policies.

In commenting on revenue bonds as the method of financing for a sewage treatment plant in Portland. Ore., the *Oregon Voter* says, "Potent argument in favor of the bonds is that they are not to be financed by a general tax levy on property." The article points out that:

"The need for unemployment relief works of this sort is too obvious to call for elaboration. Near exhaustion of funds for relief projects leaves this serious problem with us. Recognition of it, in fact, was the thing that led Congress to establish the very liberal policies placed in the National Recovery Act."

Cities that take advantage of the opportunities which the Federal Administration has set up in its public works appropriation by building needed sewerage and water-supply systems are cooperating in the national recovery program in the way considered soundest by President Roosevelt. Sewerage and water-supply systems are preferred and are given priority by the public works administration.

Revenue bonds are the most acceptable means known to finance construction of public works without increasing property taxes. They are particularly advantageous now, with the strong inducements which the Federal Government is extending to those cities which will proceed immediately with needed public works. Any city that can qualify as to the need of such work can participate in the 30 per cent grant and obtain the additional required funds at a maximum of 4 per cent interest on the sole security of revenue bonds.

Particularly significant, in regard to the Federal public works program, is the fact that sewerage and water-supply projects are given priority over all other types of non-Federal work. Where such facilities are lacking and unemployment relief is a problem, that project which will get the most prompt and favorable consideration by the public works administration is one of the two above types.

The following states have legislation of this type, in addition to Illinois: Michigan, Ohio, Maryland, Alabama, Indiana, Kentucky, Texas, Arizona, Arkansas, California, Idaho, Iowa, Maine, Montana, Nebraska, New Hampshire, North Carolina, North Dakota, Oregon, South Carolina, Tennessee, West Virginia, Wisconsin, Connecticut and New Jersey. Similar bills will be introduced in other states when legislatures convene.

A. J. R. CURTIS.

The Real Source of Our Crime Problem

By HARRY ELMER BARNES

EXPERTS on the problem of crime, some of them of the most pronounced wet affiliation and prejudices, have predicted that the end of prohibition will be followed by a criminal orgy without precedent in American history. The kidnaping epidemic seems to be a forerunner confirming this prophecy—which in no way partakes of a dry argument. Most of those who feel that we face an unprecedented crime wave believe that repeal is necessary and that we must take our chances on the crime matter.

The basis for a future crime orgy has been comprehensively laid by the developments of the last twenty years. It is a law of social psychology, formulated by Gabriel Tarde and others years ago, that the socially inferior tend to ape the socially superior. The latter capitulated pretty thoroughly to the prevailing "something-for-nothing" psychology of the era of speculative finance capitalism. Freebooting in railroads, banks, utilities, receiverships and other high-toned racketeering becomes shockingly frequent.

It was inevitable that, sooner or later, we would succeed in "Americanizing" the small fry—especially the foreign small fry. Their ancestors, if they lived in this country, had usually made an honest living conducting shoe-shining parlors, clothes-cleaning establishments, fruit stands, restaurants and the like, or at hard labor on roads, streets and railroads. The younger generation looked with envy not at the bowed backs and wrinkled brows of their parents but rather at the achievements of the American buccaneers.

About the time this something-for-nothing psychology was filtering through the skulls of the small fry along came the Noble Experiment. This was a "natural" for the budding racketeers. Nothing could have been consciously designed which could have suited their purposes more perfectly. Public opinion in many sections of the country was very definitely against prohibition, and not a few regarded the bootleggers as crusaders for the old American liberties.

Prohibition promoted other rackets—the hi-jacking racket among the wet outlaws, rackets in foods, milk, transportation, building construction and the like.

The depression further stimulated the growth of racketeering, since it threw out of work millions who might otherwise have preferred to earn an honest living. From these millions it was easy to recruit the few thousands needed as the underlings of the master minds of the racket world.

The idea that when prohibition is ended the boys who have made millions in illicit selling of booze will meekly and contritely turn to blacking shoes and slinging hash is downright silly. They will apply the technique they have mastered to the dope ring, kidnaping, bank robberies, hi-jacking of legitimate liquor supplies and the like. They will find crafty lawyers all too willing to defend them.

The kidnapings which we have been reading about may well be only the first rumblings of the oncoming tornado of organized crime. Legal beer has only begun to make inroads into the bootlegger's domain. He still has his monopoly on hard liquor. When repeal comes, the real shift will begin into new avenues of profitable activity. It may go so far that we shall have to declare martial law in certain localities. There is little hope of curbing organized crime through the usual channels of criminal jurisprudence, since the latter are all too often allied with gangsters.

Whatever methods of repression may prove necessary, they will never be wholly successful unless supplemented by deeper reforms which discredit the something-for-nothing business "ethics," secure the punishment of malefactors of great wealth, emphasize the fact that the man who earns his living is neither a boob, nor a sucker, and provide a job for every person eager to follow an honest calling.

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Breweries and Distilleries Become a Zoning Problem

By EDWARD T. HARTMAN

NOW that the Volstead law is on the toboggan, the next question is: What is a brewery? Also, what is a distillery? The siren voice of the Eighteenth Amendment lured many places into the assumption that these things didn't matter. And suddenly, under the 3.2 per cent dispensation, breweries are erupting like filling stations, hot dog stands and billboards. But breweries do not matter, says the president of one new major effort at slaking thirst, because during prohibition they had to learn to brew without odor. If the odor is as impotent as the present brew, there may be justification for the statement. But the product is somewhat bulky and involves heavy trucking, so even an odorless brewery must be appraised.

Since lawyers will be considering the question and since they are somewhat long on precedent, it may be helpful to note that the first statutory declaration on noxious trades, the Massachusetts Bay Colony act of 1692, placed slaughterhouses, still-houses, and houses for trying of tallow and currying of leather in the list. Brewing was then a home industry, which may be the cause of its omission. In 1710 it was enacted that "forasmuch, by reason of growth and increase . . . several of the houses and places then so assigned are become inconvenient for the use intended, offensive, . . . and the said act directing to that time only for the assigning of places for those uses, and not looking forward,—be it enacted, etc."—in short, that the courts might prohibit and restrain further use of a then existing distillery erected under the law, as is now done under nuisance law.

The latest authoritative statement, even though it may not be so classed by lawyers, is by Harland Bartholomew, in his "Urban Land Uses." Under four different headings, beverage (malt and spirits) manufacturing, brewing, distillation of liquors, spirits, etc., and malt products manufacture, he places these activities in the heavy industry list. Heavy industry is the modern term of noxious, offensive, hazardous trades.

It would seem, therefore, that these industries, legally dead for a period, must, in their reincarnation under the law, be classed as heavy industry. This is where they belong, under many counts, and it would be a reckless board of appeals that would permit them to be developed elsewhere. It will be done, probably, until boards become universally honest and intelligent. Unfortunately, there is as yet no definitely clear enabling law in this direction. A safer method was proposed in connection with the new Massachusetts law, but it was frowned upon by advisers and legislators alike.

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

VIEWS OF THE VOLUNTARY BOULEVARD PLANTING BY THE CITIZENS OF SHEBOYGAN, WIS.

Citizens and Civic Groups Cooperate in the Planting of City Boulevards

SHEBOYGAN, WIS.—When early in 1933 it was found that the Park Board funds of Sheboygan would be cut drastically and thus prevent the planting of the areas in the newly completed North Avenue Boulevard and that older boulevards and parks would suffer from lack of flowers, it was decided to see what effect advertising would have. A notice was inserted in the papers of the city asking whether citizens would be interested in personally planting beds along the boulevards and in parks. The response was most interesting, for replies and applications for allotments came from every possible source. Boy Scouts applied as troops, as would be expected, civic leagues applied as groups and as individuals, and many individuals who were just flower lovers and saw an opportunity to do something for their city also sent applications. Even city employees applied, and one man who had access to the municipal sewage treatment plant saw to it that his plot was fertilized with sludge.

North Avenue Boulevard is in a new section of the city and is paved with concrete and has center planting areas, with electric lights in these areas. At present the lighting is confined to one American Concrete Marbelite standard at each end of the block, but the bases and electric wiring are in for two additional standards for each block as soon as funds are available. A special type of lighting standard was used, with the recess for the transformer above ground so that the troubles that had been experienced with earlier standards through short circuits caused by water reaching the transformers would not occur again.

ARTHUR L. BOLEY,
City Engineer.

"Greater Paris"

PARIS, FRANCE.—Under the above title an article in the *Courrier des Etats Unis* of June 4 last sums up the recent progress made by the Municipal Council of Paris in carrying out its planning program. Of special interest to American municipal officials and city planners is the vigorous way in which the French authorities have pushed their building program during the depression. The report, translated by the writer of this item, is in part as follows:

"The Municipal Council of Paris and the Prefet of the Seine (Mons. Edouard Renard), worthy successors of Baron Haussmann, are carrying out with foresight, system and perseverance the program of beautifying and modernizing the 'City of Light' as well as realizing the objective of a 'Greater Paris.'

"We can picture a Parisian returning to his native city after a dozen years of absence and with a thrill of delight looking at the Champs de Mars and its chain of gardens, which now extend from the Trocadéro to the Ecole Militaire. Continuing his investigations, we can imagine his amazement at finding the Avenue des Champs Elysées commercialized from L'Etoile to Rond-Point, but, thanks to its new perspective, still preserving its old time dignity. He will also note that the Avenue Victor Emmanuel III has been prolonged to the Rue de Courcelles, the Rue Matignon transformed into an avenue to the Rue la Boëtie, the Pont de la Concorde widened, and, finally, the Boulevard Haussmann connecting without a break L'Etoile with the grand boulevards and La Republique.

"Most of the public buildings and district post offices have been modernized. Antique hospitals which were a disgrace to Paris have been either modernized or removed to the suburbs. Older school buildings have been enlarged and restored; new schools have been built with modern improvements. Across from the Parc Montsouri the City University now houses in its buildings of various styles students of every nationality eager in their pursuit of French culture.

"As for public health planning, our old Parisian friend would find some more amazing changes. The 'intra-mural' gas works, known as de Passy, de Vaugirard and de Saint-Mande, have been herded into the suburbs and their former sites replaced by public parks. In the workers' residential section he would observe that twenty city squares have been rebuilt, and a large number of alleys and dead-end passageways have been, or are now being, cleared out. On the sites of the old fortifications more than 50,000 dwellings have been provided, with modern conveniences.

TRANSPORTATION DEVELOPMENT

"He would also be proud to see how

the Metropolitan transit system has been extended. At the close of the war it had a total length of 120 kilometres. Today it extends over more than 160, without counting suburban branches now under construction. This transit network, so perfectly managed, deserves to be called the best subway system in the world.

"Paralleling the subway development, the progress made in organizing surface traffic will make it easy for our Parisian to get around town. Paris in 1920 had only 120 autobusses. Today they number close to 2,000, and each week additional motor transit facilities are taking the place of the street cars, which were too often the cause for traffic tie-ups. Traffic control now includes indicators, lights and a constantly increasing number of direction signals at fixed intervals to control traffic flow, including one-way streets and turning directions.

"The enlargement of the approaches to Paris necessitated by the increase in traffic congestion and the overflow of population into the suburbs has gone along hand in hand with the planning of the city fringe. Our friend would be particularly struck by the alterations in the Porte Dauphine giving access to the Bois de Boulogne, with underground passageways for crosstown vehicles. Other developments along this line include the covering-up of the belt line railroad, the completion of the Boulevard Suchet, which now joins the Parc de Porte D'Auteuil and extends as far as the race track. Wide avenues now penetrate in all directions and are already lined by luxurious houses which have grown up like mushrooms.

"Tomorrow it will be the turn of the Porte Maillot, whose development will be completed by tearing down Luna Park and the old Restaurant Gillet, the enlargement of the Pont de Neuilly and the extension of the Avenue de la Defense as far as Saint-Germain. This vast project, originally conceived by Napoleon I, now includes the widening of the paved thoroughfare to Versailles and a terminal for all main line trains on the Left Bank, the complete rebuilding of the station and the Quartier Mont Parnasse and the construction of a bridge across from the Alma.

PROVISIONS FOR RECREATION

"Along lines of public recreation several stadiums and swimming pools, notably the Stadiums Jean Boin, Roland-Garros and the Moliton pool, have been built. The City Council is now studying a project originated by the well-known city planner, Mons. Duffrieux. This includes two bathing beaches, one 1,200 metres long, the other 880 metres; a lake for boating and canoeing, a nautical landing station, a stadium with tennis courts and other sports, an airport for tourist traffic, and eventually a satellite city adjacent to the park. The project embraces an area of about 200 hectares upon land paralleling the Seine across from Choisy-le-Roi. If the project goes through, the existence of this splendid City of Sports will provide another attraction for our Capital, and additional elbow room for the physical development of the city and suburban public.

"In an article published in the *Journal* last month, Mons. Francois Latour, former member of the Municipal Council and now reporter-general of the Budget, states that 'by pursuing since the beginning of the depression an intensified realization of its building program, the city of Paris has been able, through the scope of its public powers, to discount in a large measure the effects of the economic crisis.'

OUTDOOR LIGHTING

"From the artistic point of view, our old Parisian would not fail to approve of the new scheme for lighting the city. Thanks to the capable originators who gave adequate value to the architecture and placing of our public monuments (whose richness, by the way, many Parisians overlook), Paris by night is a fairyland of high lights and shadows. Who can describe the admirable panorama to be seen from the Terrace of Saint-Germain or from Meudon? Floodlights pick out the clear and flaming outlines of Notre-Dame, Sacré-Coeur, the Madeleine, the Invalides, the Opéra, the Chambre des Députés, the Obélisque, the historic monuments in the Place de la Concorde, with its luminous fountains; the Arc de Triomphe and the Eiffel Tower, all beautifully illuminated by the most modern devices.

"The night life of Paris has also been changed. In calm and silence, and wholly at his ease, one can drink in the splendor of the Parisian night free from the uproar of motor horns and claxons. Vehicles now roll silently under guidance of the traffic lights—another reform about which no one registers complaints."

NATHANIEL S. OLDS,
Planning Foundation of America.

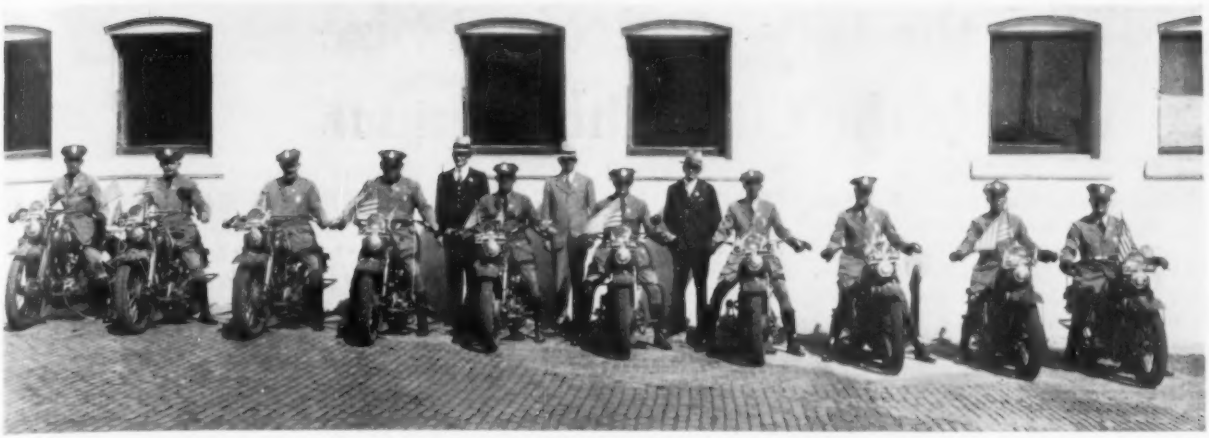
Profitable Use of Present Opportunities for Park Improvement

PERTH AMBOY, N. J.—The Perth Amboy Department of Parks has used this economic period in tireless efforts to construct and develop the eight municipal parks.

The city has provided a large municipal stadium for recreational competitive purposes, which has a one-quarter-mile cinder track, also laid out for all other track events. The field itself is constructed for baseball and football use, and has seating provisions for approximately 5,000. Much skill has been used in beautifying the grounds in and around the stadium; shrubbery of many varieties has been planted.

Two baseball grounds have been constructed in addition to the city stadium, to meet the recreational demands in two other sections of the city. The additional baseball parks have a seating capacity of 1,000 each.

NEW TENNIS COURTS AND SHORE FRONT PARK IMPROVEMENTS IN PERTH AMBOY, N. J.



MOTORCYCLE SQUAD OF THE MACON POLICE DEPARTMENT
Standing, left to right: Chief of Police Ben T. Watkins; Mayor G. Glen Toole; and City Attorney E. W. Maynard

The Park Department has constructed ten tennis courts, distributed among several parks. The number of courts will be increased with the need of the public. These tennis courts have been much in demand, bringing in revenue. A nominal charge is made to properly control their use.

In developing the city parks extensively during the last two years, the construction program has been made possible despite financial adversity. Work has been supplied to the unemployed and handled efficiently with the cooperation of the State Relief Administration. Regardless of the fact that the Park Department has been handicapped with unemployed not familiar with construction implements, the situation has been met successfully.

One of the city parks is located on the waterfront of the Raritan River. Owing to heavy storms, land was gradually being washed away. By using unemployed help, a bulkhead or sea-wall was erected to prevent this. The wall is 200 feet long and 7 feet high. The stones used in its construction were picked up along the shore in that locality.

The shore front park is an added beauty-spot in the city. Previous to the construction of this park, the property along the shore was desolate. Now it is almost completely reclaimed, and has been developed with drives, walks and gardens.

Commendations are due Commissioner Albert G. Waters, Director of the Department of Parks and Buildings, and Louis P. Booz, City Engineer, who have cooperated in promulgating the Park Department plans, and have shown much skill in organizing and supervising these projects.

GEORGE T. LUCAS,
Civil Engineer.

Macon's Motorcycle Police Perform Many Services

MACON, GA.—The period of the last ten years has confronted police executives with a host of traffic problems previously unknown to police departments. The exploitation, enhanced efficiency and economic distribution of automobiles and motor trucks have increased these traffic worries. A careful study of the situation from every angle, together with an analysis arrived at by trained traffic experts, has resulted in the introduction of motorcycle sections or patrols in the police departments of many modern cities. Experiments in Macon plainly indicated that the motorcycle officer could with greater efficiency and speed, and with less cost, handle congested traffic and emergency traffic calls, and patrol arterial streets, than could mounted patrolmen or motor patrolmen.

In Macon, motorcycle officers are selected with the following points in view: (1) personality; (2) neatness and personal appearance; (3) tact; and (4) knowledge of traffic conditions and laws. During the past year, our motorcycle section was responsible for 2,225 arrests, of which more than 70 per cent dealt directly or indirectly with traffic violations. The remaining arrests were due to the fact that motorcycle officers were the first to reach the scene of disturbance, which may or may not have been in the particular section of the city which they were patrolling. However, there are many instances where tactful reprimands by the officer have increased the respect of the general public for the motorcycle officer and at the same time served far better than an arrest.

The use of the motorcycle officer for the clearing of streets and handling of traffic during parades, ball games and athletic contests, fire, ambulance and emergency calls, congestion of downtown streets, and the patrolling of heavy traffic areas and residential sections, cannot be duplicated by any other branch of the service. In traffic snarls, the motorcycle is able, owing to its smallness, to slip through traffic angles, locate the key to the situation, and clear up the snarl in one-half the time needed by any other branch of the service. Pick-up, speed, and general make-up make the motorcycle an ideal machine for traffic work.

A study of Macon police statistics for 1932 shows that the motorcycle section prosecuted 2,225 cases, was responsible for fines and bond forfeitures totaling $7,713.70; bonds to higher courts, $18,675.00; and days served on stockade, 6,182. A still further study of statistics indicates that the initial cost and upkeep of the motorcycles used in the Department was less than one-half the cost of the motorized equipment used in the other branches of service.

In the regulation of speeding and the enforcement of traffic rules, the motorcycle officer is both feared and respected by the driver of automobiles and other motorized equipment, whereas this is not true in the case of unmounted officers. Chronic speeders, drivers with reckless tendencies, and the more common "careless driver," are all afraid of the motorcycle officer and hence are more mindful of traffic regulations in areas known to be patrolled by motorcycle officers.

FEWER ACCIDENTS

Through efficiency of traffic patrols, accidents have been materially decreased in Macon. Just how much they have been decreased one cannot correctly estimate, since there are factors entering into the estimate that cannot be reckoned on paper. But it is known that when the causes of traffic accidents, such as speeding, reckless driving, and failure to observe stop signs and traffic signals, have been removed by efficient motorcycle patrols, accidents cannot happen. Macon has been usually free of serious traffic accidents, and hospital statistics prove that most of the accidents occurring in this section are beyond the boundaries of the city and hence beyond the areas patrolled by motorcycle officers.

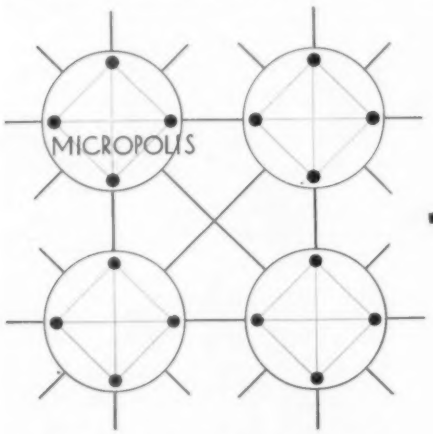
And now with the introduction of police radio broadcasting stations, the use of the motorcycle officer as a law-enforcement and crime-prevention agent will be greatly enhanced. New duties, more equipment, and more officers will be needed for motorcycle work. The work of this section cannot be overestimated in any city. It is the greatest single factor in crime prevention and traffic control available to the modern police department.

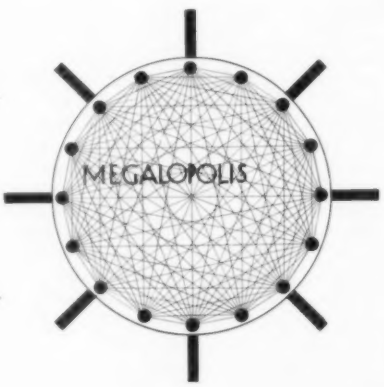
BEN T. WATKINS,
Chief of Police.

Why the City of Medium Size Will Be the City of the Future

By EUGENE H. KLABER, A.I.A.

IN discussing the future of American cities at a recent convention of city planners, a very eminent member of the profession stated that, in his opinion, our cities in America would inevitably continue to grow; that with proper planning and regulation, the defects that have arisen in the haphazard growth of our communities can be avoided; and that, with such planning, there is nothing in the mere fact of great size that precludes the development of cities in which the dweller may enjoy every benefit of physical and social well-being that he would have in a smaller city.





Coming from such a source, the statement cannot be brushed aside lightly, especially as it represents the view of an entire school of city planning. And yet, we venture to maintain that there is a point in the growth of cities at which the advantages of concentrating business and municipal activities are overbalanced by the increasing costs that inhere in mere size, regardless of our best planning endeavors. When this point is reached, the city begins to topple of its own bulk. Complicated problems arise for which even temporary remedies are enormously expensive and, in the end, prove to be mere palliatives that are quickly vitiated by unrestrained growth. It is doubtful whether planning can produce results that will be more than stopgaps in the flood of major problems of the great city.

Micropolis, Megalopolis, Metropolis

The accompanying illustrations are an attempt to show simply and graphically the basic reasoning underlying the conviction that mere size has something to do with the problem. By analogy with Patrick Geddes, the diagrams are designated respectively "Micropolis," "Megalopolis" and "Metropolis." In all three cases it is assumed that each dot represents a well-planned neighborhood unit of a given size; further, the density of population is assumed to be the same. Thus, each unit in "Micropolis" is supposed to contain four neighborhoods; "Megalopolis," which has sixteen neighborhoods, has an area within the bounding circle equal to the sum of the four circles. Again, "Metropolis" has four times the population of "Megalopolis" and four times the area. For example: if "Micropolis" has a population of 100,000 in 12 square miles, then "Megalopolis" has 400,000 in 48 square miles, and "Metropolis" 1,600,000 in 192 square miles. The density of population being the same, there is no question that there is an equal opportunity for proper planning within the neighborhood itself.

But the city consists of an aggregation of interrelated neighborhoods. When we begin to consider these interrelations, we run up against the inherent difficulties of increasing size. In a community there may be said to be an average likelihood of necessary relationship between neighborhoods. This would be all the more true in a city in which each unit is carefully planned and contains people of varying degrees of wealth, instead of the usual spotty development of groups, each of a different economic status.

This average likelihood of relation of one neighborhood to every other in the city is expressed in our diagrams by lines connecting each dot with every other one. In "Micropolis" they are shown by six lines within each city circle. Between the cities are heavier lines, expressing

the interrelation of the municipalities. In "Megalopolis" we assemble all four municipalities in one community, four times the area. It will be noted that the pattern of city life becomes at once more complicated. Instead of 32 connecting lines, we have 120. Nevertheless, there remains a semblance of pattern, more complicated, it is true, but still open and conceivably manageable. Once we step into "Metropolis" we are confronted by a perfect maze of relationships—2,016, to be exact. If, instead of being united in one city, the 64 neighborhoods were divided into 16 smaller units, the total number of lines would be 108, or about 1/19 as many. In "Metropolis" all pattern disappears, except in the sense that the complicated wiggles on the back of a dollar bill may be called a pattern.

Neighborhoods Which Know Not One Another

It will be objected at once that, in a large city, there may be very little direct relation between neighborhoods in remote parts of town; in New York, Woodlawn hardly knows Bay Ridge; in Chicago, Blue Island and Albany Park are strangers to each other. To the extent that this is true, it is admittedly a fault of city development—a fault for which planners have devised such expensive remedies as the Tri-Borough Bridge and the Burnham Plan.

These two cities owe much of their extravagant and corrupt governments to the very fact that one neighborhood knows not another. The average citizen travels in a narrow track and knows little of sections of town other than where he lives and where he works. City government is a remote mystery, with the center of which he has no contact. Conversely, with the best of intentions, it is impossible for the city fathers to be responsive to the will of the citizens. For that matter, they have not one will, but hundreds. Is it surprising that the average man gives up in despair any idea of watchfulness over the complicated machinery of government? Is it strange that the city becomes the prey of self-seeking interests? The whole concept of American democracy is based on small communities and responsible citizenship. No such thing as New York of today was imagined. It is only in occasional small communities that one still finds our democracy really functioning.

It may be contended that these are merely theoretical diagrams; that the faults of our great cities arise rather out of overcrowding than out of mere numbers. Conditions in New York give color to this belief, but the peculiar topography of New York makes it a special case; it is not the typical American city. Let us rather consider Chicago. Here is a city of about 3,500,000 inhabitants, covering 211 square miles. This is an average of about 26 persons per acre, or, at 3.5 persons per family, less than 8 families per acre. Even if we allow as much as 25 per cent of the city area for necessary business and industrial use and park space, the result is less than 10 families per acre; surely this is not crowding the land inordinately.

And yet, because of its very bulk, Chicago suffers the same kind of difficulties as New York, even if in a lesser degree. Vehicular traffic is a colossal problem, parking down town is impossible; people spend hours getting to and from work; police and fire protection over so wide an area is extremely difficult; problems of water supply, smoke prevention, sewage and waste disposal, street cleaning, delinquency and disease assume vast proportions. As the city expanded, it overflowed its borders and it is surrounded by suburbs over which it has no control. When the gangsters find it inconvenient to stay in town, they overrun Cicero, and Chicago stands there powerless to do anything about it.

A Maximum Efficient Size of Cities

Of course it is obvious that, up to a certain point, there are decided advantages to be derived from increasing centralization. The town that cannot support an adequate fire and police force is handicapped. Other municipal features, such as water purification, entail basic costs that do not increase pro-rata until the city has attained considerable size. But in all these things there is at some point an optimum, beyond which the tendency is toward increased per capita cost. Why are the telephone rates allowed by public service commissions higher in large cities? Consider our diagrams as a plotting of telephone intercommunication and you have the answer.

If then, as we contend, there is a maximum efficient size of cities, beyond which the tendency is to ultimate chaos and ruin, it behooves us to study where the turning point occurs and, on the basis of our conclusions, to plan our cities for a definite and *limited* growth. We cannot accept the thesis that indefinite expansion is inevitable; it can and must be controlled. Only by control of growth can we plan a municipality that will not have to be scrapped every few years at enormous cost. How much have our cities paid in taxes for replacing sewer and water mains that were planned for much smaller towns, for widening streets that cannot bear the traffic? New York boasts of the Catskill aqueduct—what cost per capita? With a limit of final growth set in advance, such utilities could have been planned at the outset to take care of eventual needs.

Why, then, do some city planners still cling to the idea that our cities must go on in their unrestrained expansion? It is because their approach to the problem is deductive and not inductive. The deductive point of view is that of the land speculator and the owners of centralized general business. The more the city grows, the greater the opportunity of profit for those who hold the key positions in the city framework. To them, business is the prime factor. Their concept starts with a centralized commercial section, to which the rest of the city is tributary. The more it grows, the more the profit. The whole object of city planning from this point of view is to drive more and more people to the center. Radial avenues, street transportation, subways, all aim to bring people in, not to spread them out. Thus, from the idea of the town center as a field for profit, the rest of the city is deduced. It is this method that has always prevailed in the development of our great American cities.

The inductive method starts, not at the center of a city, but at its perimeter. Its motivation is a concept of a maximum feasible community. Its points of attack are the home, the neighborhood and the interrelationship of neighborhoods. From these premises, it works inward, finally determining the business and industrial requirements of the city. They, too, must be proportionate to the population. In this way business and industry are made a function of the employment and consumption needs of the people, and not the cause for which people live.

Is it because they have never stopped to consider the basic concept of what a city should be, or because they are willing to let him who pays the piper call the tune, that so many city planners still arise in defense of "Metropolis"?

Recent City Manager Appointments

KYLE BRUCE has succeeded Elmer C. Barton as City Manager of Bluefield, W. Va.

F. C. Elsey is the new City Manager of Yale, Okla. Ed. McClary had served in that capacity since October, 1929.

A. P. Hancock, City Manager of Crystal City, Texas, an unofficial council-manager city, since November, 1928, succeeded R. B. Ellis, resigned, as City Manager of Kerrville, Texas, on September 1.

Nelson G. Lyons has become City Manager of Oak Park, Mich.

W. W. Mynatt, Director of Service in Knoxville, Tenn., on August 15 received appointment as City Manager of that city. Neil Bass has accepted a position on the staff of the Tennessee Valley Authority.

THE INTERNATIONAL CITY MANAGERS' ASSOCIATION.

The Answer of the Water-Works Industry to Criticisms of the National Industrial Recovery Act

THE National Recovery Committee for Water-Works Construction, composed of consulting engineers and water-works equipment manufacturers, has found a sentiment in a few communities against incurring any additional indebtedness to undertake the construction at the present time of needed public facilities, as part of the National Industrial Recovery plan. This is due in great measure to the feeling that there is a marked betterment in industrial activity and the hope that it will, therefore, not be necessary to expend money on construction. There is also criticism of the provision in the National Industrial Recovery Act for a Federal grant of 30 per cent of the cost of labor and materials, on the assumption that this is actually a gift of Federal money to the citizens of the country. Some citizens believe that communities ought not to use Federal money under these conditions for any municipal purpose. Municipalities do not apparently generally appreciate the extent of the benefits which they will receive through cooperation in the recovery plan through the construction of needed facilities at this time.

The normal program of public and private construction was, in the decade prior to the depression, approximately 8 billion dollars per year. This amounted to about 10 per cent of the aggregate national income—the total of the estimated earnings of the individuals of the country. Such construction thus afforded investments in useful facilities for those in the country who wished to save, on the average, 10 per cent of their income. Through construction, therefore, these savings were immediately redistributed as purchasing power paid out for labor and materials going into new structures. At the present time, it is indicated that the 1933 public and private construction program will be less than 2 billion dollars. If it is possible, through the National Industrial Recovery Act, to add 3.3 billion dollars to this 2 billion dollars, there may be expected in the next twelve months a total construction program of only 5.3 billion dollars. This is 10 per cent of a national income of 53 billion dollars, and is none too large to provide investments for savings which may be expected as the result of success of the recovery program. Owing to inevitable withdrawal of a certain proportion of individual income from industry for savings and investment purposes, the recovery program cannot move forward without a construction program to convert these savings and investments into purchasing power. The present great upturn in manufacturing activity requires, therefore, corresponding speed in placing all the 3.3 billion dollars' worth of work authorized under construction. The responsibility for speeding-up construction work for approximately 2 of these 3.3 billions of dollars falls upon state, county and municipal bodies. Their cooperation with the Government in initiating work on needed facilities is therefore essential to the success of the recovery plan.

Even if all the funds made available in the Recovery Act were to be spent on works that could be completed within one year, they would not raise construction activities to normal unless present activities in industrial and residential construction were more than doubled.

The Federal grant to state, county and municipal bodies of 30 per cent of the cost of labor and materials for all work which they initiate under the Recovery Act is not a gift of Federal funds, but is actually a rebate of part of the Federal revenue from taxes which will be collected owing to the release of 3.3 billion dollars of new purchasing power. It is fairly well established that new purchasing power released through construction activities creates for every dollar paid out for construction cost an average of $20 of transactions in the first year. These transactions consist of the repeated spending of the money by the persons receiving it, one after the other. The rate of transactions falls off as time progresses and may drop to $12 in the second year and $7 in the third year. If, therefore, 3.3 billion dollars is released in new purchasing power, it will create, within twelve months of the time the expenditures are made, a total of 66 billion dollars of transactions. It is well established that the national income, consisting, as explained, of the total of individual incomes, amounts on the average to 8 per cent of the total of the business transactions of the nation. The transactions resulting from a 3.3 billion-dollar construction program would thus contribute to the national income in the first year 5.28 billion dollars, or 8 per cent of 66 billion.

If national recovery is to become a fact, no community can afford to neglect its opportunity to secure funds under the terms of the Recovery Act for construction now of its needed facilities. Since, on the average, a grant of 30 per cent of labor and materials amounts to a grant of 25 per cent on the total cost of a municipal project, the money to be borrowed will amount to 75 per cent of the cost. The Federal charge for interest, 4 per cent, and amortization for a 25-year period on the money loaned, 2½ per cent, amount to 6½ per cent on the money borrowed, which equals 4.9 per cent on the total cost of the project. In other words, a project costing $100,000 will require annual payments of only $4,900 for 25 years to cover interest and amortization. If, however, the community fails to cooperate in the recovery plan, but finds it must build its needed facilities within the next few years at costs for labor and materials adjusted to 1925-26 prices, the cost of the same project may be approximately $150,000. Interest and amortization will amount to at least 7 per cent, and the annual cost to the community will be $10,500 a year, more than twice the annual cost resulting from construction under the National Industrial Recovery Act. Therefore, in addition to creating work now for many who remain unemployed, transferring them from the dole to creative work, and reducing taxes for unemployment relief, facilities which the community must construct to serve the normal demands of normal community life can be created at less than half the ordinary annual cost.

Land Economics School Established

THE establishment of a School of Land Economics in New York City is announced by the Institute for Economic Research. "The aim of the School is to give a broad training in land economics and land policies. It will include a study of the factors and principles underlying the efficient utilization of land, both from the standpoint of owner and investor and from that of public policy and social control. It will study existing maladjustments and means by which they may be overcome. It will aim to furnish a scientific basis for the determination of public policies and for all needful planning, zoning and other social controls, in the general field of land utilization."

The School will afford a maximum of opportunity for informal conference and for the exchange of practical data and experience. This feature will be stressed rather than that of the formal lecture.

A course in Problems in Land Use and Planning will be given by Dr. Robert Whitten, planning consultant, and past-President of the American City Planning Institute. Lectures on practical and legal phases of Planning and Zoning Administration will be given by Edward M. Bassett, a pioneer in the development of planning and zoning ordinances and legislation. Dr. Richard T. Ely, President of the Institute for Economic Research, will give a course and a round table conference on Land Economics. Other competent instructors will deal with housing, land appraisal, economics of farm lands, etc. Joseph Platzker will lead a series of field trips and conferences on "community investigations."

The school year will begin October 2, 1933. Information may be secured from John E. Burton, Executive Secretary, School of Land Economics, 551 Fifth Avenue, New York.

TRAFFIC CONTROL AND FACILITATION

Conducted by Publications Committee, Institute of Traffic Engineers, 175 Fifth Ave., New York

Maxwell Halsey, Chairman, Harry Hemmings, Reyburn Hoffman, Benoit Laberge, Theodore T. McCroskey, Donald M. McNeil, A. J. Naquin, Hawley S. Simpson, Arthur G. Straetz, Peter J. Stupka, Lawrence S. Tuttle, John C. Wrighton

The Safety of Divided Roadways

By **ARNOLD H. VEY**

Traffic Engineer, Department of Motor Vehicles, State of New Jersey

MOST motor-vehicle accidents can be directly charged to an improper action on the part of the person or persons involved, regardless of whether such action is wilful, negligent or due to ignorance.

It seems reasonable that if highway users knew and would voluntarily observe safe highway practices at all times while upon the highways, the present-day accident problem would be materially minimized if not practically eliminated.

However, because of the differences in make-up of the millions of humans granted the privilege of operating their vehicles upon the highways, and their susceptibility to improper practices, together with their inability to successfully deal with the every-day distractions of life, the problem of safety is made most difficult. In order, therefore, to cope with the weaknesses of the human mind and body and to bring about safety upon the highways, roadway facilities should be designed and used which are inherently safe; that is, they should be so constructed that it will be difficult for highway users to perform improper practices.

A roadway facility recently developed to provide greater safety upon the highway is a divisional island forming a divided roadway, which is sometimes called a dual highway. Such a facility segregates the opposing flows of vehicular traffic, thereby eliminating the hazard of collision between vehicles approaching in opposite directions; also providing additional factors of safety such as intercepting the rays of headlights of opposing vehicles by the planting of shrubs along the central strip, and offering a place of refuge for pedestrians while crossing the highway from curb to curb.

A Year's Accident Experience

In order to determine the approximate number of accidents which might have been prevented along a portion of a major roadway in New Jersey (Route 25) had a divisional island been in existence, a survey of the accident experience for the year 1932 has been made. The survey segregated accidents into classifications by their types: that is, accidents in which vehicles were approaching at right angles; vehicles approaching in opposite directions; vehicles approaching in the same direction; fixed-object collisions and pedestrian accidents.

The roadway selected has available four improved concrete lanes for travel and is subject to heavy high-speed traffic, at times equaling a total of 45,000 vehicles in a 24-hour day.

The table on page 70 gives a summary of the accident experience.

A review of this table will immediately show that there are types of accidents which a divisional island will not correct or eliminate; for example, the right-angle collision type, and collisions with fixed objects.

Effect of Divisional Islands Upon Collisions

A divisional island, however, will entirely correct collisions between vehicles approaching in opposite directions where each vehicle is going straight through, commonly termed "head-on" collisions. Such an island will also have some effect upon collisions between vehicles approaching in opposite directions, where one vehicle is making a left turn into a cross street. Also, a divisional island will have some effect upon collisions between vehicles going in the same direction; such an island eliminates the practice of vehicles attempting to overtake and pass vehicles ahead by using the left half of the roadway, a practice which oftentimes results in rear-end or cutting-in collisions. Pedestrian accidents will also be affected by a divisional island, since it will offer to pedestrians a place of refuge while crossing the roadway from curb to curb, thereby making it necessary for them to observe traffic in only one direction for each respective half of the roadway.

A conservative estimate of the approximate percentage of the total accidents which have occurred along this highway and which might have been prevented had a divisional island been constructed, is 35 per cent.

Using a money value of $300 per accident, a figure often used by insurance companies, an economic loss can be computed which, if applied as interest charges on a capital expenditure for the construction of a divisional island, will make possible an investment more than adequate to pay for the cost of the island. Such a construction, therefore, will not only be economically sound but will render a humane service by curtailing the sorrow and suffering which accompany motor-vehicle accidents.

INTERSECTION OF ROUTES 38 AND 40, NEAR CAMDEN, N. J., SHOWING DIVIDED ROADWAYS

DIVIDED ROADWAY ON MORRIS AVENUE, UNION, N. J.

ACCIDENT EXPERIENCE ALONG ROUTE 25 FROM NEWARK-ELIZABETH LINE TO THE CLOVER LEAF—1932

Types of Accident Collision	Number of Accidents	Per Cent of Total
Right angle	53	8.1
Same direction	289	44.0
Opposite direction—Left turn	76	11.5
Opposite direction—Head-on	113	17.1
Fixed object	58	8.8
Pedestrian	69	10.5
Total	658	100.0

Annual Meeting of Institute of Traffic Engineers

THE annual meeting of the Institute will be held October 3-6, at the Stevens Hotel, Chicago, Ill. On the first afternoon, the Bureau of Public Roads and the Institute will conduct a demonstration in Grant Park showing the effect of automobiles striking various types of loading platforms. Besides committee reports and discussions, a wide range of topics in the field of traffic engineering will be presented in papers by T. E. Transeau, Philadelphia; L. Segoe, Cincinnati; E. W. James, Washington; Lloyd P. Rader, Brooklyn, N. Y.; Arnold H. Vey, Trenton, N. J.; E. B. Lefferts, Los Angeles, Calif.; J. W. A. Boolong, Seattle, Wash.; John C. Wrighton, Chicago; and I. S. Shattuck, Oakland, Calif.

The Yonkers Traffic Survey

A CITY-WIDE traffic survey was recently made in Yonkers, N. Y., under the direction of the Planning Commission, with the cooperation of the Boy Scout Organization and the Department of Public Safety. About 450 Scouts participated in the survey, making detailed counts at 50 points from 8:00 A.M. to 7:00 P. M. All intersections of main arteries were included, and strategically located secondary thoroughfares as well, so that a complete traffic flow map could be prepared. Turning movements were recorded at each intersection, thus giving the detailed hour-by-hour traffic pattern to be used for checking the timing of traffic lights.

The survey revealed a very pronounced shift of main north-and-south traffic during the last six years from Broadway to other arteries lying in the central and eastern sections of the city. Roughly, 49,000 vehicles entered the city during the 11-hour day. Cordon analysis of the main business district showed 28,700 vehicles coming into it. At 10:00 A.M. there were 870 more cars in this district than at 8:00 A.M.

The survey bore out the importance of recommendations that have been made for bypass routes and parking elimination. Recommendations for roadway and street widenings and establishment of new main arteries will be worked out, based on thorough analysis of the survey data.

Chart for Setting Progressive Traffic Signals

THE labor of computing the time intervals between adjacent intersections in a progressive traffic signal system will be materially lessened by use of the accompanying nomographic chart. The following examples show how the chart is applied.

To find the time interval necessary for non-stop traffic moving at 28 miles per hour between intersections 700 feet apart, connect the point representing 28 miles per hour on the speed scale with that representing a distance of 700 feet, and produce this line to intersect the time interval scale at the left of the chart. On this, read 17 seconds.

The charts may also be used to determine the speed which traffic must observe between intersections for any time interval between signals. Assume two intersections 1,100 feet apart, with a time offset between signals of 30 seconds. To find the speed, connect by a straight line the point representing 30 seconds on the time interval scale with the point representing 1,100 feet on the distance chart and prolong this line until it intersects the speed scale at the right; reading 24.4 miles per hour.

FREDERICK L. MOSHER and GILBERT ROBINSON.

—Abstracted from article by the authors in *Civil Engineering*, for May, 1933. The chart used herewith has been revised by Mr. Mosher since appearing in *Civil Engineering*, to correct minor inaccuracies in plotting the logarithmic values.

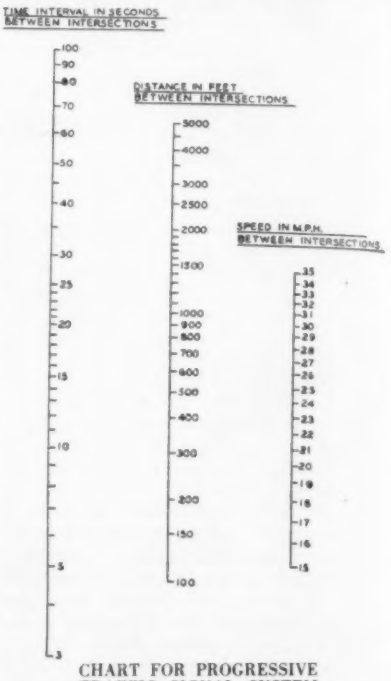
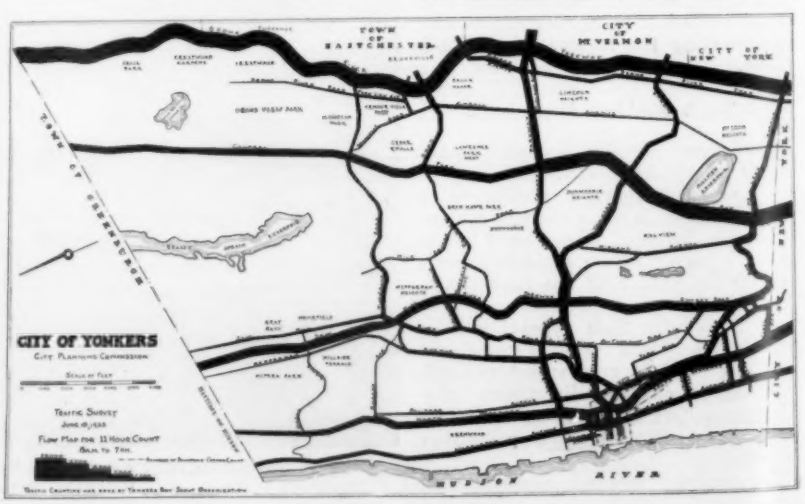

TIME INTERVAL IN SECONDS BETWEEN INTERSECTIONS
DISTANCE IN FEET BETWEEN INTERSECTIONS
SPEED IN M.P.H. BETWEEN INTERSECTIONS

CHART FOR PROGRESSIVE TRAFFIC SIGNAL SYSTEM

See "Making Unemployment Relief Funds Save Lives in Traffic," by Burton W. Marsh, in the 1933 Municipal Index.



How to Apply for Federal Aid for Public Works

WITHIN the last month four circulars, enunciating policies and setting forth procedure, have been issued by the Federal Emergency Administration of Public Works. These are:

1. The Purposes, Policies, Functioning and Organization of the Emergency Administration—The Rules Prescribed by the President.
2. Information Required with Applications for Loans to States, Counties, Municipalities and Other Public Bodies.
3. Information Required with Applications for Loans to Private Corporations (Other Than Loans for Housing Projects and for Projects for the Protection and Development of Forests and Other Renewable Natural Resources).
4. Information Required with Preliminary Applications for Loans for Low-Cost Housing or Slum Clearance Projects.

In determining the eligibility of each project submitted, the Administrator, State Advisory Board and State Engineer, under the Public Works Administration, will apply the following tests:

1. The relation of the particular project to coordinated planning, and its social desirability.
2. Economic desirability of the project, i.e., its relation to unemployment and revival of industry.
3. The soundness of the project from an engineering and technical standpoint.
4. The financial ability of the applicant to complete the work and to reasonably secure any loans made by the United States.
5. The legal enforceability of the securities to be purchased by the United States or any lease to be entered into between the applicant and the United States.

Classes of Projects Preferred

Preference will be given to (1) projects integrated with and consistent with a state plan rather than to the isolated or inconsistent; (2) projects which can be started promptly are to be preferred to those requiring delay; and (3) projects near centers of unemployment are to be preferred.

The Public Works Act empowers the President to make grants (gifts) to states, municipalities and other public bodies, not in excess of 30 per cent of the cost of labor and materials employed upon such a project. The rules provide that the following classes of projects will be preferred as to the grant:

1. Water-works projects not unduly burdening the community with debt, and necessary for its health and convenience.
2. Sewer projects of the same character.
3. Sewage-disposal projects sufficiently comprehensive to render a river or lake system, used by many communities, safe as a water supply, and other sewage-disposal projects.
4. Other projects, which like the foregoing, are regenerative, i.e., tend to stimulate further projects, such as highways, bridges and tunnels, opening of new territory for homes and industry, projects for the transmission of electrical energy into territories not now served.

The President, in determining whether to allow or withhold a grant, will also consider to what extent the budget of the applicant is balanced or in process of balancing, and will prefer those public bodies which put their finances in order.

Alternative Methods of Financing

The grant will not be allowed under the rules unless the public body either (a) has power to sell to the United States its bonds in sufficient amount to reimburse the United States for its outlay (less the grant if allowed) in connection with the project, and enters into a contract so to do and to complete the project, or (b) has power to convey the site of the project to the United States and contracts so to do, and to pay rental sufficient to reimburse the United States for its outlay less the grant if allowed, and to complete the project, or (c) is in process of securing the necessary powers and the Administrator is convinced that such powers will be obtained.

The United States will bid, par and accrued interest, for bonds to finance projects of public bodies, approved by the Administrator, provided the bonds bear interest at the rate of 4 per cent. Bonds and obligations under contract of lease are to be annually amortized pursuant to state statutes and according to the life of the project not to exceed 30 years, except in the case of such projects as obviously have a longer life and in no case to exceed 50 years.

Decentralized Organization with Centralized Control

The rules provide for a decentralized organization of the Public Works Administration with centralized control. Provision is made for the Planning Board which is to advise and assist the Administrator in the preparation of the comprehensive program of public works required by law. There also is provision for a labor board, which will function in cooperation with the Department of Labor, and a technical board of review to which will be referred projects approved in principle by the Administrator but of an unusual character and involving difficult questions of engineering, finance or law. To this board also will be referred controversial projects for the hearing of objectors.

Provision also is made for the setting-up of legal and financial units, serving the Public Works Administration as a whole, and other central organizations united for the consideration of various classes of projects.

The field organization will be composed of 10 regional advisors, 48 State Advisory Boards and a Public Works Engineer in each state, and their necessary staffs.

The State Engineer, appointed by the Administrator, will be the executive officer of the State Advisory Board, will organize its office, receive, record and examine all applications for projects and report to the State Advisory Board on each. This engineer will be a Federal agent. The State Advisory Boards will consider projects from the standpoint of Public Works Administration policies and submit to the Administration in Washington promptly its recommendations on all projects approved.

The regional advisors will assist the Planning Board to formulate a plan for each region and will stimulate public interest in regional and general planning. Each regional advisor will obtain from the State Advisory Board for his region lists of projects under consideration and a copy of their recommendations and rejections. From time to time the regional advisors will visit the offices of State Advisory Boards within their region and advise and consult with them to the end that their action may be consistent with sound regional planning.

Data Required with Applications

A mass of supporting data and detailed information are required of states, municipalities and other public bodies which apply to the Public Works Administration for loans or grants.

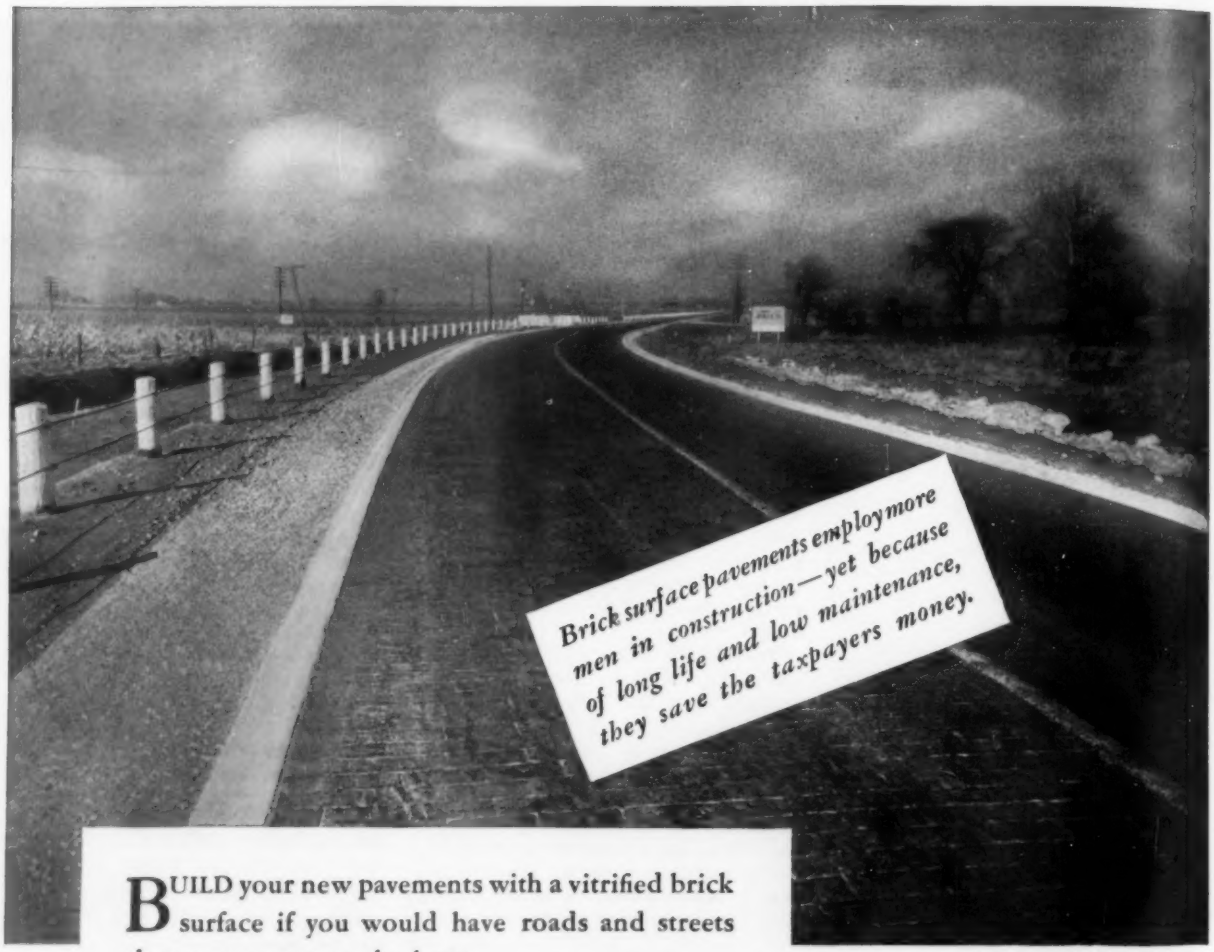
The applications, which are to be filed with the State Advisory Boards, must be accompanied by a general description of the project and detailed information as to security offered for the loan, financial set-up and all legal questions arising in connection with the project.

Statements must be filed showing the applicant's tax assessments for each of the last three fiscal years, the ratio of assessed value to actual value, the tax rate, bonded indebtedness, statement of tax delinquents, uncollected taxes—in short, a complete and detailed financial statement of the applicant.

Besides the general description of the project and drawings, the applicant is required to submit an estimate of cost in sufficient detail to permit checking, a statement of the economic and social value of the project, and an estimate of the average number to be employed each month directly on the project.

(*Continued on page 73*)

The *Most Durable Paving Surface* Costs the Taxpayers *Least*


Brick surface pavements employ more men in construction—yet because of long life and low maintenance, they save the taxpayers money.

BUILD your new pavements with a vitrified brick surface if you would have roads and streets that cost taxpayers the least.

Resurface pavement failures with *brick* if you would get the most value—now and later—from the money you spend.

Brick is the most durable of all pavement surfaces. Neither weather nor traffic can damage the surface and then destroy the expensive base.

Brick is well-nigh indestructible. That is why the upkeep is uniformly low and the life is uniformly long on brick surfaced roads and streets.

INDIANA RESURFACES

(Above) *Brick resurfacing on U.S. No. 41 near Sullivan, Indiana, which last year salvaged the old slab and provided a smooth, widened, low-maintenance surface for years to come.*

For information regarding brick pavements, write National Paving Brick Association, National Press Building, Washington, D. C.

BRICK PAVEMENTS

FACE THE FUTURE • PAVE WITH BRICK

Do you mention THE AMERICAN CITY? Please do.

The applicant also must state whether or not the project is part of a larger plan or long-range program of development, and, if so, give a description of other parts of the plan or program. If the applicant has a city or regional planning board, the views of such a board must be filed with the State Advisory Board.

All known endorsements for the project as well as all known objections to it must be reported by the applicant to the State Advisory Board. A statement also is required as to whether the project will compete with any similar enterprise.

Loans to Private Corporations

Self-liquidating loans may be made to private corporations for projects that can be considered as either bridges, tunnels, docks, dry docks, viaducts, water works, reservoirs, pumping plants, canals, markets or hospitals, when devoted to public use. Determination of whether any project constitutes one or more of these types rests solely with the Administrator and not with the applicant. Loans also may be made to private limited dividend corporations, for the protection and development of forests and other renewable natural resources, which are state-regulated.

Because of the diverse and varied nature of possible loans to private corporations, no standardized form of application blank will be issued. Applications should be addressed to the appropriate State Advisory Board in four counterparts.

Housing

The law provides for low-cost housing and slum-clearance projects under public regulation or control. Grants may be made to public bodies having the power to undertake housing projects directly in aid of such projects and either in conjunction with, or independently of, loans to them. Even though such bodies do not have the power to undertake such projects directly, they may assist such projects by the construction of adjacent parks, playgrounds, etc., in aid of which they would be eligible for a grant as well as a loan.

No housing loans will be made which cannot be safely self-liquidated during the useful life of the building. For the purpose of making application, interest may be assumed at 4 per cent and amortization at 35 years on fireproof and 25 years on non-fireproof buildings, but these are subject to adjustment. Applications for housing loans are to be made directly to Washington.

Housing Projects Approved for Federal Aid

TENTATIVE approval of several housing projects to receive Federal loans under the National Industrial Recovery Act was announced in August by Administrator Harold L. Ickes. This initial allocation of funds for housing projects is tentative under the terms of the resolution adopted calling for completion of plans and specifications and a contract with a limited-dividend corporation that is acceptable to the Administrator.

The five housing projects tentatively approved are:

Boston, Mass.—$3,500,000 to Neptune Gardens, Inc., for a modern housing project which will enable construction of over 3,000 rooms to rent at $8.50 per room on the basis of 4 per cent interest on the loan. The project is to be built on 44 acres of land in East Boston adjoining Marine Memorial Park. There will be approximately 700 residential units in brick, two-story, two-family row houses, and three-story apartment buildings, the development covering approximately 17 per cent of the land.

New York.—A $2,025,000 loan to the Spence Estate Housing Corporation for a model housing project in Brooklyn on a site now occupied by 28 four- and seven-story cold-water flats and many miscellaneous shacks. The proposed housing will consist of a six-story elevator building with 508 apartments, totaling 2,150 rooms, of semi-fireproof construction, to rent at under $11 per room per month.

Philadelphia.—An $845,000 loan for a 1,074-room development to be built by a limited-dividend corporation formed by officers and members of the American Federation of Full-Fashioned Hosiery workers. The site covers 4½ acres in the Kensington district of Philadelphia, and the new housing will consist of three-story, semi-fireproof buildings, containing 292 apartments. Room rents will be approximately $8.40 per month.

New York.—A loan of $3,210,000 for a project will be built in Woodside, Borough of Queens, by a limited-dividend company, the Dick-Meyer Corporation, under the New York State Housing Law. The proposed housing consists of 10 six-story, semi-fireproof elevator apartments, providing in all 1,632 residential units totaling 5,644 rooms, to rent at approximately $11.00 per month.

Kansas.—A $40,000 loan to the Hutchinson Suburban Housing Association to cover the erection of twenty individual four-room and five-room houses each situated on two acres of land, and renting at $30 per house per month.

Real Estate Speculation Taboo

The Public Works Administration, vitally concerned in relieving unemployment and at the same time supplying low-cost housing facilities, nevertheless is determined that housing projects shall not be used to further real estate schemes or for speculative building purposes.

To the end that all housing loans will be properly used to supply low-cost housing and not speculative profits, Administrator Ickes has directed the Housing Division of the Administration to investigate thoroughly every request for a loan from the standpoints of the social desirability of the project itself and the adequacy of the applicant's set-up. Housing projects of non-public bodies may qualify for loans only which are to be repaid the Government and are not eligible for grants.

Circulars 3 and 4 (mentioned on page 71 of this issue) deal with preliminary data required by the Administration for housing loans. If examination by the Housing Division indicates that the project is of a satisfactory character, the applicant will be advised of the detailed plans, specifications and financial statements required. The preliminary information required is that concerning the applicant itself, the construction period, character of project, management, summarized cost and income statement and planning and related data.

High Buildings Discouraged

Robert D. Kohn, Director of Housing for the Administration, reports that thirty or more housing projects from almost as many cities, in addition to those mentioned above, have been presented for consideration to the Administration. Among these schemes are several from metropolitan slum areas where high buildings to overcome high land costs were proposed. Mr. Kohn discourages such projects as unwisely permanently fixing high land values in slum areas. Such land values must reach a level of cost that reflects solely income possibilities for low-cost housing before it can be used for such purposes.

The Housing Division advocates a limit of height for housing projects from five to six stories even in crowded centers. With few exceptions, projects will be held to three stories and 35 per cent coverage of the land as a general maximum. In many cities, land in the slum areas can be purchased for as little as 75 cents per square foot, Mr. Kohn points out, thereby, despite difficulties of accumulation, making it practical for the use of low-cost housing. In metropolitan areas where slum plots are held at prohibitive prices, work is expected to be made available for the unemployed on housing projects in more remote districts where land can be bought at a low price.

WORK

that is ready to start

Replacements, enlargements and extensions of water mains are urgently needed by most of the 7853 publicly owned water supply systems in the United States. Much of this work is planned and ready to start. It is not "made" work. It is *permanent construction* necessary to the efficient operation of an indispensable public service owned by the citizens.

Starting this work now will give quick employment to many thousands of men locally and elsewhere. Seven industries—large employers of labor—are involved in the production, transportation and laying of cast iron pipe alone.

These needed improvements can be made without increasing taxes. They are an investment, not an expense. For municipal water works systems are self-supporting. The cost of improvements is liquidated out of earnings, not out of tax receipts.

Water works systems are self-supporting largely because of the long life and low maintenance cost of cast iron mains. In England, France, Germany and America, cast iron mains laid over a century ago are still rendering satisfactory service. The cost of these mains has long since been liquidated and forgotten—yet they go on serving.

Needed improvements to your municipal water supply system, if made now, will save the city money, relieve unemployment and give impetus to business recovery. Government aid in financing such projects is available when necessary. Urge your municipal officials to take advantage of it.

For further information, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Illinois.

WATER WORKS IMPROVEMENTS *are an* INVESTMENT *not an expense*

New Appointments to the State and Regional Advisory Boards

ON page 5 of THE AMERICAN CITY for August a list was published, as released from Washington on July 26, of the personnel of the 48 State Advisory Boards to which local public works projects must be submitted before applications for loans or grants will be considered by the Federal Emergency Administration of Public Works. Certain resignations and new appointments have since been announced. The revised list in full, with names and addresses of the chairmen, appears below:

ALABAMA
Milton H. Fies, Chairman, Southern Railway Bldg., Birmingham; Mayer W. Aldridge; Fred I. Thompson.

ARIZONA
William Walter Lane, Chairman, Phoenix; Leslie C. Hardy; Moses B. Hazeltine.

ARKANSAS
E. C. Horner, Chairman, New P. O. Bldg., Little Rock; Haley M. Bennett; John S. Parks.

CALIFORNIA
Hamilton H. Cotton, Chairman, State Bldg., Los Angeles; Franck Havenner; E. F. Scattergood.

COLORADO
Thomas A. Duke, Chairman; 229 Custom House, Denver; Daniel C. Burns; Miss Josephine Roche.

CONNECTICUT
Archibald McNeil, Chairman, Hotel Stratfield, Bridgeport; John J. Pelley; Harvey L. Thompson.

DELAWARE
L. Lee Layton, Jr., Chairman, State House, Dover; William B. Truitt; Willard A. Speakman.

FLORIDA
C. B. Treadway, Chairman, Tallahassee; W. H. Burwell; T. G. Buckner.

GEORGIA
Thomas J. Hamilton, Chairman, Citizens & Southern Bank Bldg., Atlanta; Arthur Lucas; Robert G. Clay.

IDAHO
Beecher Hitchcock, Chairman, State House, Boise; Frank E. Johnesse; Edward C. Rich.

ILLINOIS
Carter H. Harrison, Chairman, U. S. Court House, Chicago; James L. Houghteling; James H. Andrews.

INDIANA
Otto P. Deluse, Chairman, 401-D Federal Bldg., Indianapolis; Lewis C. Ellingham; John N. Dyer.

IOWA
Harold M. Cooper, Chairman, State House, Des Moines; W. F. Riley; E. P. Alder.

KANSAS
Arthur J. Mellott, Chairman, Topeka; Martin Miller; Ralph Snyder.

KENTUCKY
Wiley B. Bryan, Chairman, 267 Federal Bldg., Louisville; H. St. G. T. Carmichael; James C. Stone.

LOUISIANA
Edward Rightor, Chairman, 714 Masonic Temple, New Orleans; James E. Smitherman; James M. Thomson; Walter J. Burke.

MAINE
John Clark Scates, Chairman, Portland; James M. Shea; William M. Ingraham.

MARYLAND
W. C. Stettinius, Chairman, Baltimore Trust Bldg., Baltimore; J. Vincent Jamison; Charles E. Bryan.

MASSACHUSETTS
Alvin T. Fuller, Chairman, 307 State House, Boston; John J. Prindeville; James P. Doran.

MICHIGAN
Frank H. Alfred, Chairman, 10 Fisher Bldg., Detroit; Murray D. Van Wagoner; Leo J. Newicki.

MINNESOTA
John F. D. Meighen, Chairman, 1246 University Ave., St. Paul; Fred Schilplin; N. W. Elsberg.

MISSISSIPPI
Hugh L. White, Chairman, 241 Edwards Hotel, Jackson; Horace Stansell; Birney Imes.

MISSOURI
Harry Scullin, Chairman, Buder Bldg., St. Louis; William Hirth; Henry S. Caulfield.

MONTANA
James E. Murray, Chairman, 2 9 Federal Bldg., Helena; Raymond M. Hart; Peter Peterson.

NEBRASKA
Dan V. Stephens, Chairman, 420 Federal Bldg., Omaha; John Latenser, Jr.; James E. Lawrence.

NEVADA
William H. Settlemeyer, Reno; Edward W. Clark.

NEW HAMPSHIRE
Robert C. Murchie, Chairman, State House, Concord; John E. Sullivan; Charles E. Tilton.

NEW JERSEY
Edward J. Duffy, Chairman, 1060 Broad Street, Newark; William H. R. White; Walter Kidde.

NEW MEXICO
Miguel A. Otero, Sr., Chairman, Santa Fe; J. D. Atwood; D. K. B. Sellers.

NEW YORK
Peter G. Ten Eyck, Chairman, 140 State Capitol, Albany; John T. Dillon; Moritz Rosenthal.

NORTH CAROLINA
Frank Page, Chairman, Chapel Hill; John M. Devane; George W. Coan, Jr.

NORTH DAKOTA
Stephen J. Doyle, Chairman, Federal Bldg., Devils Lake; Henry Holt; Thomas H. Moodie.

OHIO
William A. Stinchcomb, Chairman, Wyandotte Bldg., Columbus; Rufus Miles; Henry Bentley.

OKLAHOMA
John H. Carlock, Chairman, Federal Bldg., Oklahoma City; Frank C. Higginbotham; Walter A. Lybrand.

OREGON
Bert E. Haney, Chairman, Federal Bldg., Portland; Robert N. Stanfield; Dr. James Gilbert.

PENNSYLVANIA
Joseph C. Trees, Chairman, Capitol Bldg., Harrisburg; A. T. Melmed; J. Hale Steinman.

RHODE ISLAND
Hon. William S. Flynn, Chairman, P. O. Bldg., Providence; John Nicholas Brown; William E. Lafond.

SOUTH CAROLINA
Thomas B. Pearce, Chairman, Columbia; L. P. Slattery; Burnet R. Maybank.

SOUTH DAKOTA
Herbert E. Hitchcock, Chairman, State House, Pierre; S. H. Collins; John A. Boland.

TENNESSEE
Roane Waring, Chairman, Nashville; W. Baxter Lee; Robert H. Baker.

TEXAS
Col. Ike Ashburn, Chairman, Fair Bldg., Fort Worth; C. A. Goeth; John H. Shary; R. M. Kelly

UTAH
William J. Halloran, Chairman, Federal Bldg., Salt Lake City; Ora Bundy; Sylvester Q. Cannon.

VERMONT
P. E. Sullivan, Chairman, 408 Rutland Bldg., Rutland; Frank H. Duffy; Les C. Warner.

VIRGINIA
J. Winston Johns, Chairman, 337 P. O. Bldg., Richmond; B. F. Moomaw; Robert B. Preston.

WASHINGTON
William A. Thompson, Chairman, Olympia; C. W. Greenough; Roy LaFollette.

WEST VIRGINIA
William P. Wilson, Chairman, Charleston; Van A. Bittner; J. H. Long.

WISCONSIN
Walter G. Caldwell, Chairman, Madison; William G. Bruce; John Donaghey.

WYOMING
Patrick J. O'Conner, Chairman, Cheyenne; Leroy E. Laird; John W. Hay.

New Regional Advisers

For four of the ten regions listed on page 67 of the August issue, new Regional Advisers have been announced during the month. These are:

Region 1, Headquarters, Boston—Adviser, George W. Lane, of Lewiston, Maine
Region 3, Headquarters, Chicago—Adviser, Charles M. Moderwell, of Chicago, Ill.
Region 4, Headquarters, Omaha—Adviser, Frank W. Murphy, of St. Paul, Minn.
Region 9, Headquarters, Atlanta—Adviser, Henry T. McIntosh, of Albany, Ga.

The headquarters of Region 10 will be in Baltimore, instead of Richmond.

The SAFETY MOTORCYCLE for POLICE SERVICE

★ **SAFETY GUARD**
This sturdy guard of heavy steel tubing — an original Harley-Davidson feature — affords real protection to the rider in the event of a sideswipe or a fall due to collision. Falling machine cannot injure rider's legs.

★ **LOW SADDLE POSITION**
Rider sits so low that he can place both feet on the ground at any time. Low-swung weight gives great security in turns, high speeds, and rough going.

Even the color of this Police Motorcycle is a safeguard — silver, as now generally used for guard rails, bridges, and other attention points.

SAFETY for the rider is an outstanding feature of the Harley-Davidson Police Motorcycle.

Department records show that the Harley-Davidson has always been a safe vehicle for police service.

Our 1934 Police Model is the safest motorcycle we have ever built. Due to low center of gravity and extremely low saddle position, it is stable and balanced at all speeds. It hugs the road, no matter how rough or fast the going, because of the perfected springing which has been a Harley-Davidson feature for many years.

The amazing speed and power of its 36 H. P. "TNT" motor, combined with ease of handling, comfort, ruggedness, and economy make this Safety Motorcycle ideal for police work.

Write for illustrated literature

HARLEY-DAVIDSON MOTOR CO.
Department M Milwaukee, Wis.

HARLEY-DAVIDSON
The Police Motorcycle

Tennessee Valley Authority Project

A Vast Experiment in Regional and Community Planning and Development

THE first effort by the Federal Government to put into effect a carefully considered plan for the physical development and social upbuilding of an entire region is now making definite progress in the rapidly maturing plans of the Tennessee Valley Authority. In an elongated area of 42,000 square miles, covering the basin of the Tennessee River in its wide sweep through seven states — Virginia, North Carolina, Georgia, Alabama, Mississippi, Kentucky and Tennessee, it is hoped to produce a basic program which can be applied to other regions in furthering the Administration's "planned future" for the nation.

Organization of the Project

Three men who rank high in the fields of engineering, educational and public service are in charge of the entire project. They are Dr. Arthur Ernest Morgan, President of Antioch College; Dr. Harcourt Alexander Morgan, head of the University of Tennessee, and Mr. David E. Lilienthal, of Wisconsin. They constitute the Board of Directors of the Tennessee Valley Authority, appointed by the President, of which Dr. Arthur E. Morgan has been designated chairman.

The Authority will direct the Muscle Shoals property, as well as construction of the proposed Cove Creek and other dams figuring in the extensive plan to supply urban and rural residents with cheap power, fertilizer, etc., at the same time opening many opportunities for employment in that region.

The possibilities for the integration of industry and agriculture are particularly fertile. A considerable problem in this area is the amount of sub-marginal farm land on which so many of its inhabitants —especially those in the mountain regions—eke out a precarious existence. Betterment of the living conditions of such people is as much an integral part of this stupendous undertaking as is the creation of jobs for residents of the industrial centers.

Assembling data on natural resources for the preparation of proper land classification is an important preliminary in this regional planning work. This specific phase of the project promises to be the most interesting one ever undertaken in America.

The important task of land planning and housing has been assigned to Earle Sumner Draper, nationally known landscape architect and community planner and prominently identified with regional and resort planning in the South.

The physical planning under Mr. Draper naturally falls into two general classifications:

1. Planning of town sites, highway and railway locations and re-locations to fit the need of new construction projects, such as the Cove Creek dam.

2. Regional planning which, by virtue of rural conditions, is a momentous project in itself and one quite different from those previously undertaken, in addition to being fully ten times as large as any yet attempted.

Power Policy

In a statement issued last month by the Tennessee Valley Authority, the following principles are set forth:

1. The business of generating and distributing electric power is a public business.

2. Private and public interests in the business of power are of a different kind and quality and should not be confused.

3. The interest of the public in the widest possible use of power is superior to any private interest. Where the private interest and this public interest conflict, the public interest must prevail.

4. Where there is a conflict between public interest and private interest in power which can be reconciled without injury to the public interest, such reconciliation should be made.

5. The right of a community to own and operate its own electric plant is undeniable. This is one of the measures which the people may properly take to protect themselves against unreasonable rates. Such a course of action may take the form of acquiring the existing plant, or setting up a competing plant, as circumstances may dictate.

6. The fact that action by the Authority may have an adverse economic effect upon a privately owned utility, should be a matter for the serious consideration of the Board in framing and executing its power program. But it is not the determining factor. The most important considerations are the furthering of the public interest in making power available at the lowest rate consistent with sound financial policy, and the accomplishment of the social objectives which low-cost power makes possible. The Authority cannot decline to take action solely upon the ground that to do so would injure a privately owned utility.

First Steps in Development

To provide a workable and economic basis of operations, the Authority plans initially to serve certain definite regions and to develop its program in those areas before going outside. The initial areas selected may be roughly described as:

(a) The region immediately proximate to the route of the transmission line soon to be constructed by the Authority between Muscle Shoals and the site of Norris Dam.

(b) The region in proximity to Muscle Shoals, including northern Alabama and northeastern Mississippi.

(c) The region in the proximity of Norris Dam (the new source of power to be constructed by the Authority on the Clinch River in northeast Tennessee).

At a later stage in the development it is contemplated to include, roughly, the drainage area of the Tennessee River in Kentucky, Alabama, Georgia and North Carolina, and that part of Tennessee which lies east of the west margin of the Tennessee drainage area.

Formal or informal applications for power service received by the Tennessee Valley Authority to date involve more than 50 places in or near the sphere of development. To make the area a work-

THE TENNESSEE VALLEY REGION
(1) Muscle Shoals. (2) Cove Creek—Site of Norris Dam

THE WAR AGAINST DEPRESSION IS ON!

Government and business have joined in a battle against "Depression." The public works plans of N. I. R. A. release huge sums of money to cities and towns; it places a great responsibility upon local authorities who must plan and successfully carry out public works projects. It means putting men to work and re-equipping public works departments—certainly a direct and deadly blow at "Depression."

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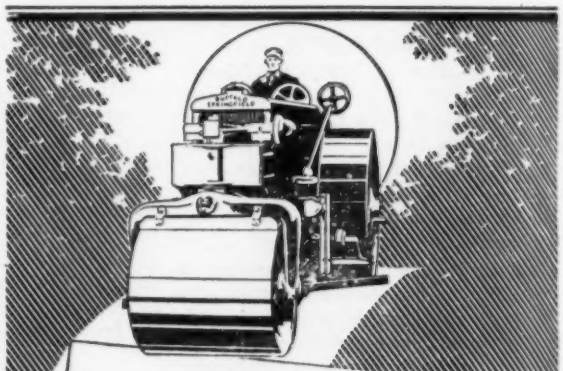

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able one and a fair measure of public ownership, the Authority believes that several cities of substantial size should be also served, such as Chattanooga and Knoxville, and, ultimately, at least one city of more than a quarter-million, within transmission distance, such as Birmingham, Memphis, Atlanta, or Louisville.

Every effort will be made by the Authority to avoid the construction of duplicate physical facilities, or wasteful competitive practices. Accordingly, where existing lines of privately owned utilities are required to accomplish the Authority's objectives, a genuine effort will be made to purchase such facilities from the private utilities on an equitable basis.

Norris Dam

In recognition of his long and successful fight for Government control of the power resources of the Tennessee River system, the proposed dam at Cove Creek will be named in honor of Senator George W. Norris of Nebraska.

Norris Dam will hold a commanding position in regulating the flow of the Tennessee River and in providing the valley with the power needed to develop the new and enduring prosperity which President Roosevelt hopes to bring it through the agency of the Tennessee Valley Authority. The building of this dam and reservoir is the first major construction project in the huge undertaking.

The site of the Norris Dam is about 20 miles northwest of Knoxville, being located on the Clinch River nearly 80 miles above the point where that major tributary empties into the Tennessee River, and one-third of a mile below the conjunction of Cove Creek, a small stream, and the Clinch River. The Norris Dam will be linked with the Wilson Dam at Muscle Shoals by a tie transmission line some 220 miles in length. The Norris Dam will form one of the world's largest reservoirs, inundating an area of about 83 square miles and creating an artificial lake with a total shore line of 800 miles.

Regional Public Works Inspectors Appointed

APPOINTMENT of ten regional inspectors of the Public Works Administration was announced on August fifteenth by Administrator Ickes.

The appointment of these inspectors, who will be in charge of Administration's investigation forces in the field, is further evidence of determination at Washington that there shall be no misuse in the expenditure of the $3,300,000,000 public works fund.

Regional inspectors' headquarters will be at Boston, New York, Chicago, Omaha, Portland, San Francisco, Fort Worth, Kansas City, Atlanta and Baltimore. The regional inspectors will receive their orders and report directly to the Public Works Division of Investigations in Washington, which is under the direction of Louis R. Glavis, who also is head of the Division of Investigations of the Department of the Interior.

All the regional inspectors are engineers familiar with the various types of construction to be undertaken in the public works program. They will see to it that contract specifications are lived up to, that the Government is not cheated, and that Government funds are disbursed as intended.

Investigators in each region will investigate complaints filed with the regional inspector.

The regional inspectors, together with their headquarters, are as follows:

REGION 1
D. J. Barry, Young's Hotel, Boston, Mass. The region consists of Maine, Vermont, New Hampshire, Massachusetts, Rhode Island and Connecticut.

REGION 2
Wharton Green, Federal Building, New York City. The region consists of New York, New Jersey and Pennsylvania.

REGION 3
Charles Allen, Old Postoffice Building, Chicago, Ill. The region consists of Illinois, Indiana, Michigan, Ohio and Wisconsin.

REGION 4
Robert A. Radford, Postoffice Building, Omaha, Nebr. The region consists of North Dakota, South Dakota, Nebraska, Minnesota, Iowa and Wyoming.

REGION 5
Roy F. Bessey, Postoffice Building, Portland, Oregon. The region consists of Montana, Idaho, Washington and Oregon.

REGION 6
Frank Y. McLaughlin, Hughes Building, San Francisco, Calif. The region consists of California, Nevada, Utah and Arizona.

REGION 7
G. L. Rodier, Old Postoffice Building, Fort Worth, Texas. The region consists of Texas, Louisiana and New Mexico.

REGION 8
F. W. Kassebaum, Postoffice Building, Kansas City, Mo. The region consists of Colorado, Kansas, Oklahoma, Missouri and Arkansas.

REGION 9
C. L. Homer, Federal Building, Atlanta, Ga. The region consists of Mississippi, Alabama, Georgia, South Carolina and Florida.

REGION 10
F. R. Keyes, Postoffice Building, Baltimore, Md. The region consists of Tennessee, Kentucky, West Virginia, Maryland, Delaware, Virginia and North Carolina.

An Unusual Elevated Water Storage Tank

THE campus of Emory University, Atlanta, Ga., has been very carefully laid out and the buildings designed so as to secure a symmetrical and pleasing skyline. Therefore, the question of an elevated water storage tank presented rather an unusual problem. The extension of the water service required a 100,000-gallon storage tank, elevated at a height of 125 feet. The R. D. Cole Manufacturing Co., Newnan, Ga., designed and built a spherical steel tank supported on a tubular steel column, arranging the base of the column with entrance doors so as to accommodate the pump, making the base of the tube a pump house.

The completed structure, shown on the front cover of this issue of THE AMERICAN CITY, presents an attractive and symmetrical outline. The tubular tower is painted with olive-green graphite, and the sphere itself is finished in metallic aluminum. These colors set in a grove of pines give a striking effect. So far as records indicate, this is the first structure of this type that has ever been erected, and its design and erection involve interesting details. The tank itself, to hold 100,000 gallons, is a sphere 30 feet in diameter, and the tubular column is tapered from the ground to the sphere. The tube is 16 feet in diameter at the base, anchored to the reinforced concrete foundations. All pipe connections, riser, steel ladders and access openings are placed inside the tubular tower.

The Municipal Bond Market

Sales of new issues, from recent numbers of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$7,881,000	Maryland, Relief and Construction	4	8.8 (Avg.)	3.25 (Avg.)
420,000	Allentown, Pa., School	3.5	1-5 (Ser.)	3.33
800,000	Onondago Co., N. Y., General	3.5	1-10 (Ser.)	3.49
100,000	Olmsted Co., Minn., Welfare	4	5 (Avg.)	3.72
296,000	Newburgh, N. Y., Improvements	4	8	3.90
9,500,000	Buffalo, Tax Sale; Refunding	4.2	10.8 (Avg.)	4.18
120,000	St. Joseph, Mo., Refunding	4.5	12.75 (Avg.)	4.18
1,000,000	Alameda Co., Calif., Relief	4.5	13.84 (Avg.)	4.37
294,000	Putnam Co., N. Y., Improvements	4.5	10.3 (Avg.)	4.39
453,000	Monroe Co., N. Y., Emergency	4.5	6.33 (Avg.)	4.47
260,000	Marshall Co., Minn., Funding and Refunding	4.5	13.5 (Avg.)	4.5
100,000	Huntington, N. Y., Welfare	5	1-10 (Ser.)	4.92
1,015,000	Columbus, Ohio, Improvements	4.6	9.17	4.99
2,735,000	Philadelphia, Pa., City	5	20-30 (Opt.)	5
177,500	Trumbull Co., Ohio, Relief	5.2	2.33 (Avg.)	5.09
125,000	Swissville, Pa., School	5.25	6.75 (Avg.)	5.18
458,000	Montclair, N. J., School	5.5	11.5	5.45
302,724	Greenburgh, N. Y., Improvements	5.5	12.2	5.46

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Ask the Tarvia field man, or write us, for a copy of the new Barrett Road Book containing tables and useful information about Tarvia and Tarvia-lithic.

When you write for that catalog, kindly mention THE AMERICAN CITY.

THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Accidents

City held liable for automobile collision with unlighted silent policeman at street intersection (North Carolina Supreme Court: *Speas v. City of Greensboro*, 167 S. E. 807).

Exercise of a governmental function exempts city from liability for negligent operation of fire truck (Texas Court of Civil Appeals: *Connally v. City of Waco*, 53 S. W. 2d, 313).

Park Commissioners held not liable for personal injuries caused by toboggan slide (North Dakota Supreme Court: *Holgerson v. City of Devils Lake*, 246 N. W. 641).

Municipal officers are personally liable to private persons for neglect or misfeasance in performing ministerial duties (Vermont Supreme Court: *Ferraro v. Earle*, 164 Atl. 886).

Airports

City held empowered to operate airport outside municipal limits and regulating aircraft over it (Tennessee Supreme Court: *Silverman v. City of Chattanooga*, 57 S. W. 2d, 552).

Annexation

Attempted annexation of territory without notice to owners is unconstitutional (Texas Court of Civil Appeals: *City of West University Place v. State*, 56 S. W. 2d, 1081).

Territory held not subject to organization as village while proceedings were pending to annex it to city (Missouri Supreme Court: *State v. Smith*, 53 S. W. 2d, 271).

Civil Service

War veteran held entitled to preference in appointment to Fire Department although statute took effect after application for examination (Minnesota Supreme Court: *State v. McDonald*, 246 N. W. 900).

City held empowered to remove policemen and firemen because of shortage of funds, despite civil service provisions (Michigan Supreme Court: *Slavin v. City of Detroit*, 247 N. W. 145). See, also, *City of Middlesboro v. Byrd*, 57 S. W. 2d, 49, decided by Kentucky Court of Appeals.

Finances

Official decision to refund bonded indebtedness instead of paying it held not subject to judicial review (Kentucky Court of Appeals: *Fox v. Boyle County*, 53 S. W. 2d, 192).

Libel

Councilman's introduction of resolution falsely impugning judge's decision as being corrupt held criminally libelous, not being introduced in good faith (Wisconsin Supreme Court: *Branigan v. State*, 244 N. W. 766).

Municipal Utilities

Issuance of bonds for electric light equipment, etc., held properly restrained because varying purpose authorized by electors (Oklahoma Supreme Court: *State v. King*, 19 Pac. 2d, 138).

Power to levy special assessment for street improvements" held not to cover white way lighting system (Florida Supreme Court: *Utley v. City of St. Petersburg*, 144 So. 53).

Official Compensation

City paying official salary to usurper of office held not thereby relieved from liability to de jure officer; not liable where salary has been paid to de facto officer (Indiana Appellate Court: *Morten v. City of Aurora*, 182 N. E. 259).

Petitions

Petition circulated and signed on separate sheets of paper and afterwards bound as one document held valid (Illinois Supreme Court: *People v. Sackett*, 184 N. E. 646).

Policemen's Bonds

Suit on statutory bond of policeman held properly brought by city on behalf of person unlawfully arrested (United States Circuit Court of Appeals, Fourth Circuit: *City of Beckley v. Moran*, 61 Fed. 2d, 238).

Purchases

Comptroller held not warranted in withholding payment for equipment because of anonymous news item stating that large commissions had been paid on sale (New York Supreme Court, Appellate Division: *N. P. Nelson Iron Works v. Berry*, 262 N. Y. S. 181).

Removing Officers

Charter authority to council to remove "officers" held not to authorize removal of alderman (Texas Court of Civil Appeals: *Diffie v. Cowan*, 56 S. W. 2d, 1097).

Illegally dismissed officer held not entitled to pay until restored to office (Ohio Court of Appeals, Cuyahoga County: *Thomas v. City of Euclid*, 182 N. E. 605).

Revenues

Under statute, town held entitled to half of road tax collected, although levy was for county bridge purposes (Mississippi Supreme Court: *Gully v. Attala County*, 145 So. 907).

Rubbish Removal

Ordinance granting exclusive right to remove rubbish upheld (California District Court of Appeal: *Ex Parte Pedrosian*, 13 Pac. 2d, 389).

Sewers

City held criminally liable for nuisance created by defective sewer, but $1,500 fine was excessive (Kentucky Court of Appeals: *City of Ludlow v. Commonwealth*, 56 S. W. 2d, 958).

City held not liable for flooding of private property on sewer proving inadequate, especially under unusual conditions (Pennsylvania Supreme Court: *Aron v. City of Philadelphia*, 164 Atl. 777).

Farmer held without right of action on account of slight annoyance through discharge of sewage into creek (Texas Court of Civil Appeals: *City of Olney v. Chandler*, 57 S. W. 2d, 323).

Street Improvements

City held powerless to assess state lands for street improvements, except as permitted by statute (Washington Supreme Court: *State v. City of Olympia*, 18 Pac. 2d, 848).

Street Railroads

Street railroad breaching duty to repave held subject to suit for penalty but not for specific performance (Pennsylvania Supreme Court: *City of Coatesville v. Christiana & Coatesville Street Railway Co.*, 23 Pa. Munic. Law Rep. 217).

Expiring Annapolis franchise for interurban railroad line held terminable without approval of state public service commission (United States District Court, District of Maryland: *R. E. Duvall Co. v. Washington, Baltimore & Annapolis Electric Railroad Co.*, 60 Fed. 2d, 315).

Taxation

County held liable to town for failure to collect taxes (New York Court of Appeals: *Town of Amherst v. Erie County*, 183 N. E. 851).

Taxicab Regulation

Certificate to operate taxicabs held properly revoked for operating in unauthorized localities (Pennsylvania Superior Court: *Day v. Public Service Commission*, 164 Atl. 65).

Ordinance requiring certificate to operate vehicles carrying passengers for hire upheld (Texas Court of Civil Appeals: *Fletcher v. Bordelon*, 56 S. W. 2d, 313).

Workmen's Compensation

Policemen held not covered by Workmen's Compensation Act as being "employees" (Tennessee Supreme Court: *Cornett v. City of Chattanooga*, 56 S. W. 2d, 742).

Compensation Act, as applied to municipalities as employers, held constitutional (Georgia Supreme Court: *City of Macon v. Benson*, 166 S. E. 26).

102 *years* of experience have taught International Harvester that

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IN a time of industrial stress two courses are open to a business organization. It can abandon the field of action, crawl into the cyclone cellar, and begin an endless period of WAITING. A costly course, because to stand still is to fall back.

OR—it can continue to build for an inevitably larger future.

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In this Half-Ton 6-Cylinder Truck for light delivery, International this year has set a new standard in style and performance. The chassis of this truck, Model D-1, sells for $360, f. o. b. factory.

International has recently announced a remarkable 2-ton value in the Model B-4. The 145-in. wheelbase chassis sells for $1045, f. o. b. factory. There are also 1½ and 3-ton models.

Impressive heavy-duty truck values were presented last year in the powerful 6-cylinder 5 to 7½-ton International Models A-7 and A-8. Built in four wheelbases, for heavy dump, tractor trailer, and cross-country service.

The two McCormick-Deering *TRACTRACTORS*, T-20 and T-40, announced in 1931 and 1932, have proved a sensation through *remarkable accessibility and low maintenance cost.* And now, in *DIESEL* power application to McCormick-Deering tractor design, International Harvester takes another forward step. The large TracTracTor shown is available powered either with a Diesel engine or a 6-cylinder gasoline engine.

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MUNICIPAL AND CIVIC PUBLICATIONS

Prices quoted do not include postage, unless so stated.

A Manual of Housing

Housing—Where, When, and How?—By Henry Wright. In Architecture (Charles Scribner's Sons, Publishers, New York) for July and August, 1933. 50 cents per copy.

A notable service to the cause of better housing has been rendered by author and publisher in making available these valuable studies, to which 32 pages each are devoted in the two issues of *Architecture*, above mentioned. Mr. Wright's long experience as an architect and town planner of exceptional vision, intelligence and public spirit has enabled him to write a manual of housing in which idealism and practical advice are combined in almost ideal proportions. The main headings of his discussion are: (I) The Blight of Our Cities; (II) Where Shall We House?; (III) Blight Rehabilitation; (IV) Visualizing the Possibilities of Rehabilitation of Blighted Areas; (V) The Case for Group Housing; (VI) Enter the Group Dwelling. Many charts, plans, and photographs illuminate these studies.

Two conclusions which can hardly escape the intelligent reader are: (1) land must not under any conditions be subdivided and sold before its use is actually determined and it is both needed and intended for immediate and complete building under building plans made and adopted in general form at the same time and part of the same process; and (2) land now subdivided but only partly used or not at all must be re-studied for re-assembly and re-subdivision, the planning to include streets and public utilities the most efficient and best which can be designed in relation to potential use.

Home Rule

Law and Practice of Municipal Home Rule, 1916-1930.—By Joseph D. McGoldrick, Assistant Professor of Government in Columbia University; Member of the New York Bar. Columbia University Press, New York. 1933. *XIV* + 413 *pp.* $4.50 *from* THE AMERICAN CITY.

Now that municipal home rule no longer excites heated enthusiasm or deep dismay, Dr. McGoldrick surveys its many forms in sixteen states, and reviews the years of its continuing development, 1916-1930, on a basis of legislation and court decisions, in order to determine its working value in securing the elimination of burdens, abuses and inefficiency. The volume is intended to be read with "The Law and the Practice of Municipal Home Rule," by Professor Howard Lee McBain, published in 1916, and follows Professor McBain's plan of arrangement of text and his analytical index. Dr. McGoldrick's enlivening style and power of clear expression are put to good use in organizing and illuminating the vast amount of material assembled. In the chapters on "The Relation of Home Rule Cities to the State" and "The Scope of Municipal Affairs," the problems involved in distinguishing between local and state affairs are set forth; the policies of the legislature and the judiciary in the establishing of home rule; the overlapping involved in matters of court jurisdiction, control of public utilities, annexation, police administration, and police power, including zoning; and other important elements of the broad survey. The Appendix gives "Constitutional Provisions for Home Rule in the States," and an alphabetical Table of Cases precedes the Index.

Beer Regulation

"The Regulation of the Sale of Beer, Light Wines and Soft Drink Beverages by Wisconsin Cities, Villages and Towns" is presented in 23 mimeographed pages by the League of Wisconsin Municipalities. It includes a suggested ordinance and a summary of the legal status of such regulation, together with suggested application and license forms. June, 1933. 50c; free to member municipalities. (Apply to the League, 114 N. Carroll St., Madison, Wis.)

County Government

American County Government.—By Arthur W. Bromage, Associate Professor of Political Science, University of Michigan. Sears Publishing Company, Inc., New York. 1933. *VIII* + 306 *pp.* $3.00 *from* THE AMERICAN CITY.

How county government came to be the "mess" that it is; what its structure is understood to be; what constitutional and political difficulties stand in the way of reform; and what proposals—county home rule, county managers, county consolidation, elimination of township governments—have been made and in some cases carried out, for the elimination of evils;—these are, broadly, the elements of this study. The illuminating description of "Systems of Rural Government" given in Chapter III is gratefully received by the lay reader; as are also Chapter VII, on "County Administration," and Chapter IX, on "The Township." Having reached the Prospectus which concludes the chapter on "Reconstruction of Local Government," one realizes the truth of the statement: "All moves to reorganize counties have to be made on a checker-board of local patriotism."

Municipal Administration

The Evolution of Municipal Organization and Administrative Practice in the City of Los Angeles.—By Burton L. Hunter, Master of Science in Public Administration; Efficiency Engineer, Bureau of Budget and Efficiency, City of Los Angeles; Lecturer, School of Government, University of Southern California. Parker, Stone & Baird Co., Los Angeles, Calif. 1933. *XV* + 283 *pp.* $5.00 *from* THE AMERICAN CITY.

This study is of interest and value not only as a handbook of information about the municipal governmental structure and administration of Los Angeles, but also to students of government, as an illuminating history of municipal expansion, organization and reorganization. A valuable chronological organization table is included, covering the years 1542-1933 in the development of the city.

Industrial Development

The Industries of Greater London.—By Douglas H. Smith, B.Sc. (Econ.), Ph.D., F.R.G.S. Foreword by Sir Raymond Unwin, Dr. Tech H.C. (Prague); P.R.I.B.A. P. S. King & Son, Ltd., Orchard House, Westminster, London, England. 1933. *XI* + 188 *pp.* 10 *shillings net.*

This book is to the town planner an illustration of excellent coordination of gathered information and statistics to serve both individual purposes and extensive surveys. Sir Raymond Unwin says in his Foreword: "The survey . . . is one of great value in itself, and of even greater value as indicating the kind of information which ought to be available for the whole of the London region and for many other districts where industrial expansion is taking place, or where efforts to promote it are badly needed. Those engaged upon town and regional planning find the greatest difficulty in obtaining the kind of information upon which their proposals should be based."

Water Supply

"Consolidated Water for Los Angeles County" is a 16-page pocket-size pamphlet, issued, as Report No. 3, by the Los Angeles Bureau of Municipal Research. It contains a paper by Sterling C. Lines, engineer and member of the Citizens Committee for City and County Consolidation, delivered at a luncheon on January 5, 1933, when the Directors of the Metropolitan Water District of Southern California were guests of the Committee. This paper is preceded by the Bureau's analysis of the tax situation in Los Angeles County in relation to the financing of the construction of the Colorado Aqueduct. (James O. Stevenson is Director of the Bureau.) Mr. Lines reviews, in questions and answers, the subject of water supply for Los Angeles and environs, and its financial aspect. (Apply to the Bureau.)

Highways

"Proceedings of the Nineteenth Annual Highway Conference," held at the University of Michigan February 14-16, 1933, under the direction of the College of Engineering, with the cooperation of the Michigan State Highway Department, the Michigan Association of Road Commissioners and Engineers, the Michigan Good Roads Association and the Michigan Traffic and Safety Directors' Association. Including material on destructive and constructive governmental economy; unemployment relief through highway work; vehicle fees and taxes; various features of road and bridge construction; accident prevention; traffic problems etc. 286 pp. Illustrated. (Apply to the University.)

City Planning

The Chicago Plan Commission (208 W. Washington St., Chicago, Ill.) has published (June 1, 1933) the story of 25 years of accomplishment in a 24-page illustrated pamphlet, "The Chicago Plan in 1933." Some 85 public improvements outlined in the Plan are today either complete or so far advanced that their early completion is assured. A brief description of each of these is given in this pamphlet.

County Planning

Fairfield County is the first planned county in Connecticut. The Fairfield County Planning Association issued in June, 1933, a report on the first year of the plan. 12 interesting pages, with maps and charts. (Apply to the Association, Bridgeport, Conn.)

Housing

A 12-page reprint from the *Journal* of the American Water Works Association of May, 1933, presents "Utility Distribution Systems in Housing Projects," by Nathan B. Jacobs, President, Morris Knowles Incorporated, Pittsburgh, Pa. This is a paper read before the Central States Section of the Association, September 22, 1932. A particularly interesting section of the study is the one showing that the new type housing as a part of modern comprehensive city planning, by creating the neighborhood unit type of community development, develops new street layouts that make new problems in the design of distribution systems. (Apply to the author.)

Libraries

The American Library Association has published "Current Problems in Public Library Finance," edited by Carl Vitz, Librarian, Toledo Public Library. This contains seven chapters, by competent authorities, on the business administration of public libraries, and their financial problems. The volume is of special value in these times of difficulty. VIII + 128 pp. $1.25. (Apply to the Association, 520 N. Michigan Ave., Chicago, Ill.)

Regional Planning

An elaborate booklet presents the regional planning of the Catalonian territory in Spain ("El pla de distribucio en zones del territori catala")—a preliminary study of provisional solutions—by Nicolau M. a Rubio i Tuduri, architect, with the collaboration of Santiago Rubio i Tudiri, engineer. 76 pp. Illustrated; folding map. Printed in Spanish. 1932. (Apply to the author, Barcelona, Spain.)

Standards and Specifications

"Standards and Specifications for Metals and Metal Products" (nationally recognized standards and specifications for ores, metals, and manufactures except machinery, vehicles, and electrical supplies). Miscellaneous Publication No. 120, issued March 11, 1933, by the Bureau of Standards, U. S. Department of Commerce. Prepared by George A. Wardlaw, under the direction of A. S. McAllister, Chief of the Division of Specifications. XI + 1,359 pp. $3.00. (buckram). (Apply to the Superintendent of Documents, Washington, D. C.)

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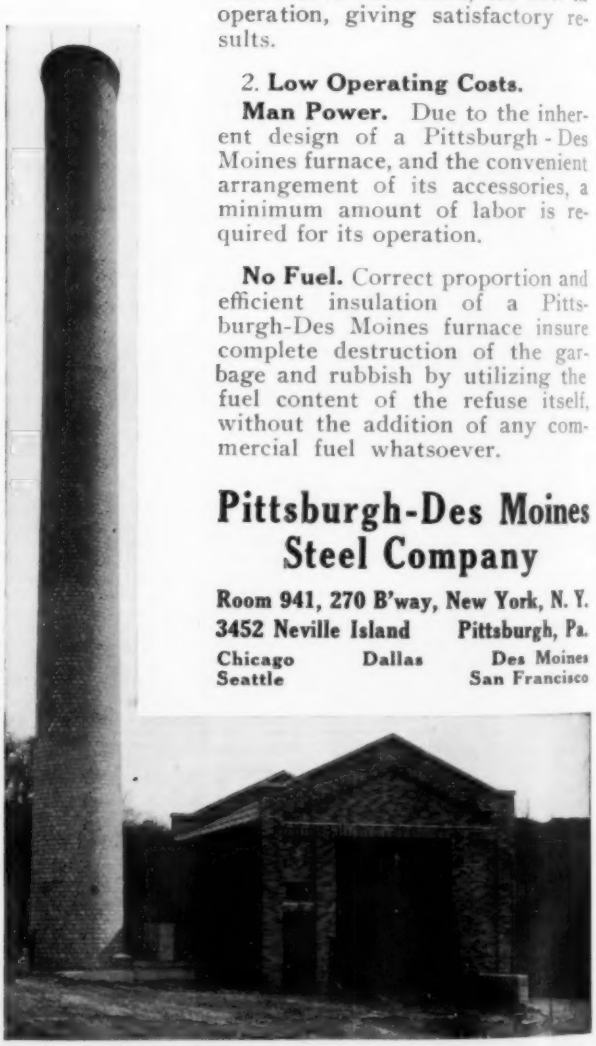

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Municipal Golf Courses

The Public Links Section of the United States Golf Association (110 E. 42d St., New York) has issued (1933) a 38-page pamphlet entitled "Municipal Golf Courses in the United States, with Statistical Information." In 1932, 213 cities and county park commissions reported a total of 329 courses. The information given includes date of opening; operating department; extent; fees; record of use; cost of operating; source of maintenance; equipment; name of professional. (Apply to the Association.)

Public Health

The "Proceedings of Southern Branch, American Public Health Association," covering the meeting held at Birmingham, Ala., Nov. 14-16, 1932, have been published, at 50c a copy, by The American Public Health Association, 450 Seventh Ave., New York. 100 pp. The material presented is, in large part, especially applicable to the Southern States, but is also of general interest. (Apply to the Association.)

Infant Mortality

The American Child Health Association (450 Seventh Ave., New York) has published (July, 1933) its "Statistical Report of Infant Mortality for 1932 in 955 Cities of the United States." Tables and text. "The almost uninterrupted downward course continues in the rate for the urban portion of the Registration Area since its formation in 1915. There is a suggestion in these figures of a successful adjustment to the trying times of these last few years." 51 pp. (Apply to the Association.)

Tennessee River Basin

Large detail map of the Tennessee River Basin, compiled from state maps of the U. S. Geological Survey; showing the principal dam sites investigated by the Corps of Engineers, U. S. Army, for power and navigation on the main river and for power and storage; also the constructed power dams. 64 x 39½ inches. 75c. (Apply to U. S. Geological Survey, Department of the Interior, Washington, D. C.)

Administration of Justice

An analysis of the total expenditures for the administration of justice, both civil and criminal, in Ohio has been made by the Institute of Law of The Johns Hopkins University, working in conjunction with the Judicial Council of Ohio and the Ohio State Bar Association, as a part of a general study of judicial administration in Ohio. It is published (1933) in a book of 253 pages, prepared by Ruth Reticker, with the collaboration of Leon C. Marshall. Many tables and charts. Published by The Johns Hopkins Press, Baltimore, Md. Paper-bound, $2.50; cloth, $3.00. (Apply to the publishers.)

Taxation

At the request of the City Counselor's Office of St. Louis, Mo., the Bureau of Municipal Research of that city has prepared a 7-page mimeographed memorandum of "Suggestions for Improving the Administration of the Gasoline Tax of the City of St. Louis." July, 1933. "If the seven provisions suggested are adopted and enforced, there is no reason why every cent due the city for gasoline license taxes in the future cannot be promptly collected." (Apply to the Bureau.)

"Prepayment of Real Estate Taxes" is a mimeographed explanation of the Chapter of the Laws of Wisconsin requiring city, village and town treasurers to accept partial payments of real estate taxes in advance, together with recommendations as to procedure and forms to be used. It has been prepared (August, 1933) by the League of Wisconsin Municipalities, 114 N. Carroll St., Madison, Wis. 13 pp. (Apply to the League.)

Health

The 1932 Proceedings of the Texas Public Health Short School contains articles on Laboratory Methods and Findings, Health Work in Schools, and Miscellaneous Health Problems. 100 pp. 50c plus postage. (Apply to Mrs. M. Pierson, Secretary-Treasurer, 110 E. 14th St., Austin, Texas.)

Municipal Finance

The Public Administration Service (850 E. 58th St., Chicago, Ill.) has issued (August, 1933) a report to the Executive Committee of the Municipal Finance Officers Association of the United States and Canada, on "Municipal Debt Defaults: Their Prevention and Adjustment," prepared by Carl H. Chatters, Executive Director, with the collaboration of A. M. Hillhouse, Simeon E. Leland, Cushman McGee, and C. E. Rightor. Publication No. 33. 65 pp. "Intended to serve as a practical guide for those municipalities which are earnestly striving to solve the difficult problem of meeting their just debts and maintaining essential public services." (Apply to the Service.)

Municipal Government

"Our Money's Worth of City Government," by Mabel L. Walker, Executive Secretary, General Welfare Tax League, has been reprinted from *Independent Woman*, July, 1933, in a 2-page leaflet. It is a keen analysis of the principles of determining the values of governmental services in terms of life and welfare—involving reliable standards, and studies of unit costs. (Apply to the author, 309 E. 34th St., New York.)

Other Reports Received

CHICAGO, ILL.—Annual Appropriation Bill for the Year 1933. 151 pp. (Send 10c postage to Municipal Reference Library.)

CHICAGO, ILL.—"A Century of Progress in Water Works—1833-1933." Prepared by Bureau of Engineering, Department of Public Works. 47 pp. (Send 3c postage to Municipal Reference Library.)

CHICAGO, ILL.—Annual Report, Retirement Board, Policemen's Annuity and Benefit Fund, 1932. 22 pp. (Send 3c postage to Municipal Reference Library.)

DALLAS, TEXAS.—General Budget for 1933-34, submitted by the City Manager. 215 multigraphed pp.

EAST ORANGE, N. J.—Annual Report, Board of Health, 1932. 76 pp.

MICHIGAN.—City and Village Debt as of January 1, 1933. June, 1933. 20 mimeographed pp. and 2 folding tables. (Send $1.00 to Michigan Municipal League, Ann Arbor, Mich.)

NEW YORK STATE.—Annual Report of the State Board of Housing, dated April 5, 1933. 88 pp.

PHILADELPHIA, PA.—Annual Report, Art Jury, 1932. 36 pp.

WORCESTER, MASS.—Annual Report, Superintendent of Sewers, Year Ending November 30, 1932. 51 mimeographed pp.

Helps for Teachers and Schools from Federal Relief Funds

ANNOUNCEMENT has been made by Harry L. Hopkins, Federal Emergency Relief Administration, of the availability of Federal relief funds, under certain restrictions, to aid needy teachers and schools. In a letter dated August 19, addressed to the Governors and State Emergency Relief Administrators, Mr. Hopkins said:

"Your relief commission is authorized to use Federal relief funds now available or to be made available by the Federal Emergency Relief Administration to pay work relief wages to needy unemployed teachers or other persons competent to teach, and assign them to classrooms up through the eighth grade; provided, first, that these teachers are assigned by the relief offices to appropriate educational authorities who will have entire supervision over their activities; secondly, provided that they are assigned only to those schools which prior to this date have been ordered closed or partially closed for the coming school year because of lack of funds; third, this applies only to rural counties. State Relief Administrations are also authorized and urged to pay from above funds relief work wages to needy unemployed persons competent to teach adults unable to read and write English. This applies to cities as well as rural counties. Under no circumstances should relief funds be used to relieve counties of their proper responsibility for education, nor should these activities permit the substitution of relief teachers for regular employed teachers."

ZONING and PLANNING NOTES

Prepared by FRANK B. WILLIAMS

Eminent Domain—Zoning Ordinance as Affecting Value

CALIFORNIA.—*City of Beverley Hills v. Auger.* 15 Pac. 2d, 867 (District Court of Appeals, October 28, 1932).—In a legal proceeding by the city to take certain real estate within the city by condemnation, the landowners claim that the valuation of the land was too small. Under a zoning ordinance passed by the city, the land in question was placed in a residential district. The landowners claimed that the city, having enacted the ordinance, was estopped from offering it in evidence; that the value of the land was lessened by the restriction; and that, since the ordinance might be repealed, value should not be calculated on the restricted use, but upon all possible uses of the land.

The Court held that the zoning ordinance was admissible in evidence as showing the possible use of the land at that time, irrespective of the fact that the ordinance might be changed. There was no evidence introduced that the restriction of the land to residential use lowered its value. The mere fact that the use of land is restricted does not prove or raise a presumption that the value is lessened by the restriction. Often such a restriction raises its value. The city was not estopped from introducing the ordinance as a fact tending to show conditions affecting the use of the land.

Invalid Zoning Ordinance

PENNSYLVANIA.—*Fierst v. William Penn Memorial Corporation.* 166 Atl. 761 (Supreme Court, May 1, 1933).—The fact that the defendants knew of the pendency and subsequent passage of an invalid ordinance before establishing a cemetery did not affect their right to use their land for that purpose.

Planning in Los Angeles

The Los Angeles County Regional Planning Commission has issued its Seventh Annual Report of its Zoning Section, being the report for 1932.

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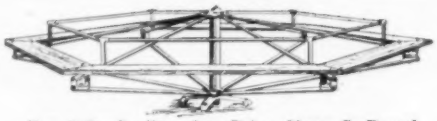

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CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

SEPTEMBER 7-8.—NEW YORK. (200)
National Shade Tree Conference. Annual convention. Secretary-Treasurer, Dr. Rush P. Marshall, Yale University, New Haven, Conn.

SEPTEMBER 7-9.—STATE COLLEGE, PA.
Pennsylvania Water Works Operators' Association. Annual convention. Secretary-Treasurer, I. M. Glace, 506 South Office Building, State Capitol, Harrisburg, Pa.

SEPTEMBER 9-19.—CRUISE FROM MONTREAL TO CHICAGO. (400)
Union of Municipalities of the Province of Quebec. Annual convention. Secretary-Treasurer, T. D. Bouchard, 132 St. James Street, Montreal, Que.

SEPTEMBER 13-15.—HAMILTON, ONT.
Canadian Good Roads Association. Annual convention. Secretary-Treasurer, George A. McNamee, New Birks Building, Montreal, Que.

SEPTEMBER 13-15.—TRAVERSE CITY, MICH. (300)
Michigan Municipal League. Annual meeting. Director, Harold D. Smith, University of Michigan, Ann Arbor, Mich.

SEPTEMBER 14-15.—RUSSELL, KANS. (200)
Kansas Association of Municipal Utilities. Annual convention. Secretary-Treasurer, L. C. Angevine, Superintendent, Water and Electric Department, McPherson, Kans.

SEPTEMBER 17-20.—CHICAGO, ILL. (350)
American Institute of Park Executives and the American Park Society. Annual convention. Executive Secretary, William H. Walker, 2234 Inglewood Place, South Bend, Ind.

SEPTEMBER 18-21.—SANTA CRUZ, CALIF. (1,000)
League of California Municipalities. Annual convention. Secretary-Manager, R. Earl Ruddy, 1095 Market Street, San Francisco, Calif.

SEPTEMBER 18-19.—SANTA CRUZ, CALIF. (100)
California Sewage Works Association. Annual convention. Secretary, Professor E. Reinke, University of California, Berkeley, Calif.

SEPTEMBER 18-20.—CHICAGO, ILL.
International City Managers' Association. Annual convention. Executive Director, Clarence E. Ridley, 923 East 60th Street, Chicago, Ill.

SEPTEMBER 19-22.—GRAND RAPIDS, MICH. (150)
American Water Works Association—Central States Section. Joint meeting with the Michigan Conference on Water Purification. Secretary of the Central States Section, B. J. Lechner, Water Department, Erie, Pa.

SEPTEMBER 19-20.—CHICAGO, ILL.
National Association for Better Housing. Annual convention. Secretary, Henry A. Guthrie, 59 East Van Buren Street, Chicago, Ill.

SEPTEMBER 19-22.—BRIDGEPORT, CONN.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 19.—JAMESTOWN, N. DAK. (75)
League of North Dakota Municipalities. Annual meeting. Executive Secretary, Myron H. Atkinson, Bismarck, N. Dak.

SEPTEMBER 21-22.—ERIE, PA. (250)
League of Cities of the Third Class in Pennsylvania. Convention. Secretary, Byron C. Houck, City Clerk, Williamsport, Pa.

SEPTEMBER 21-23.—MILWAUKEE, WIS.
International Association of Public Works Officials. Annual convention. Secretary, A. M. Anderson, 100 North La Salle Street, Chicago, Ill.

SEPTEMBER 22-23.—JEFFERSON CITY, MO. (100)
Missouri Water and Sewerage Conference. Secretary-Treasurer, H. M. Bosch, Jefferson City, Mo.

SEPTEMBER 22-23.—CHICAGO, ILL.
United States Conference of Mayors. Secretary, Paul V. Betters, Drexel Avenue and 58th Street, Chicago, Ill.

SEPTEMBER 24-27.—NEW YORK.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, C. M. Anderson, Chamber of Commerce, Memphis, Tenn.

SEPTEMBER 25-27.—MILWAUKEE, WIS. (200)
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

SEPTEMBER 25-27.—MILWAUKEE, WIS.
American Water Works Association—Wisconsin Section. Annual convention. Secretary, L. A. Smith, Superintendent of Water Works, Madison, Wis.

SEPTEMBER 26-29.—WILKES-BARRE, PA.
International Association of Municipal Electricians. Annual convention. Secretary, W. H. Harth, Columbia, S. C.

SEPTEMBER 27-29.—BEDFORD, IND. (300)
Municipal League of Indiana. Annual convention. Executive Secretary, S. E. Spurgeon, Kokomo, Ind.

SEPTEMBER 28-29.—ST. PETERSBURG, FLA. (400)
Florida League of Municipalities. Annual convention. Secretary, E. P. Owen, Jr., 1709 Barnett National Bank Building, Jacksonville, Fla.

SEPTEMBER 28-30.—ST. JOHN, N. B. (50)
Union of New Brunswick Municipalities. Annual convention. Honorary Secretary-Treasurer, John B. McNair, Fredericton, N. B.

SEPTEMBER 28—OCTOBER 1.—CHICAGO, ILL. (500)
The Public Ownership League of America. Biennial conference. Secretary, Carl D. Thompson, 127 North Dearborn Street, Chicago, Ill.

OCTOBER 2-6.—CHICAGO, ILL. (3,000)
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 2.—WORCESTER, MASS. (75)
New England Sewage Works Association. Annual meeting. Secretary, F. W. Gilcreas, 14 Beacon Street, Boston, Mass.

OCTOBER 3-6.—CHICAGO, ILL.
Institute of Traffic Engineers. Annual meeting. Secretary-Treasurer, Hawley S. Simpson, 175 Fifth Avenue, New York.

OCTOBER 3-4.—MILWAUKEE, WIS.
Wisconsin Chiefs of Police Association. Annual meeting. Secretary, R. H. McCarty, Kaukauna, Wis.

OCTOBER 4-5.—SPRINGFIELD, MASS. (160)
Massachusetts Police Association. Annual convention. Secretary, James F. Rogers, 338 Malden Street, Medford, Mass.

OCTOBER 5-6.—ASBURY PARK, N. J. (500)
New Jersey State League of Municipalities. Annual convention. Executive Secretary, S. S. Kenworthy, Trenton Trust Building, Trenton, N. J.

OCTOBER 7-9.—INDIANAPOLIS, IND.
Conference of State Sanitary Engineers. Annual meeting. Secretary-Treasurer, R. E. Tarbett, U. S. Public Health Service, Washington, D. C.

OCTOBER 8-13.—ATLANTIC CITY, N. J. (500)
American Prison Association. Annual congress. General Secretary, E. R. Cass, 135 East 15th Street, New York.

OCTOBER 9-11.—MILWAUKEE, WIS. (350)
American Association of State Highway Officials. Annual convention. Executive Secretary, W. C. Markham, 1222 National Press Building, Washington, D. C.

OCTOBER 9-12.—INDIANAPOLIS, IND.
American Public Health Association. Annual meeting. Acting Executive Secretary, Dr. Kendall Emerson, 450 Seventh Avenue, New York.

OCTOBER 9-11.—BALTIMORE, MD.
American Civic Association, Inc. Joint meeting with National Conference on City Planning. Executive Secretary, Miss Harlean James, Union Trust Building, Washington, D. C.

OCTOBER 9-11.—BALTIMORE, MD.
National Conference on City Planning and American City Planning Institute. Joint meeting with American Civic Association. Secretary, Flavel Shurtleff, 130 East 22d Street, New York.

OCTOBER 11-13.—HOLDREGE, NEBR. (500)
League of Nebraska Municipalities. Annual meeting. Secretary-Treasurer, C. E. Beals, 407 East 12th Street, Crete, Nebr.

OCTOBER 12.—INDIANAPOLIS, IND. (100)
Central States Sewage Works Association. Joint meeting with American Public Health Association. Secretary-Treasurer, G. H. Radebaugh, Urbana & Champaign Sanitary District, Urbana, Ill.

OCTOBER 16-20.—PHOENIX, ARIZ. (500)
National Tax Association. Annual conference. Secretary, W. G. Query, South Carolina Tax Commission, Columbia, S. C.

OCTOBER 16-19.—OKLAHOMA CITY, OKLA. (350)
Southwest Water Works Association. Annual convention. Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 16-18.—HARLINGEN, TEXAS. (300)
League of Texas Municipalities. Annual convention. Executive Secretary, Harvey W. Draper, 319 Kress Building, Houston, Texas.

OCTOBER 17-21.—CHICAGO, ILL. (200)
American Institute of Steel Construction, Inc. Annual convention. Executive Director, Charles F. Abbott, 200 Madison Avenue, New York.

OCTOBER 19-20.—MINNEAPOLIS, MINN. (75)
American Water Works Association—Minnesota Section. Annual meeting. Secretary-Treasurer, Ronald M. Finch, 240 South Fourth Street, Minneapolis, Minn.

OCTOBER 19-20.—PEORIA, ILL. (350)
Illinois Municipal League. Annual convention. Secretary, A. D. McLarty, Urbana, Ill.

OCTOBER 19-20.—CHARLOTTESVILLE, VA. (250)
League of Virginia Municipalities. Annual convention. Executive Secretary, Morton L. Wallerstein, 408 Travelers Building, Richmond, Va.

OCTOBER 20-24.—OAKLAND, CALIF.
American Water Works Association—California Section. Annual convention. Secretary-Treasurer, R. F. Brown, P. O. Box 506, Stockton, Calif.

OCTOBER 23-25.—CHANUTE, KANS. (250)
League of Kansas Municipalities. Annual convention. Executive Secretary, John G. Stutz, Lawrence, Kans.

OCTOBER 24-26.—DENVER, COLO. (100)
American Water Works Association—Rocky Mountain Section. Annual meeting. Secretary-Treasurer, B. V. Howe, 437 State Office Building, Denver, Colo.

OCTOBER 26-28.—ST. LOUIS, MO. (100)
American Water Works Association—Missouri Valley Section. Annual meeting. Secretary, Earl L. Waterman, University of Iowa, Iowa City, Iowa.

NOVEMBER 6-8.—STATESVILLE, N. C.
American Water Works Association—North Carolina Section. North Carolina Sewage Works Association. Joint annual meeting. Secretary, H. G. Baity, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 6-10.—MINERAL WELLS, TEXAS. (200)
Texas Public Health Association. Annual convention and school. Acting Secretary-Treasurer, Mrs. M. Pierson, State Board of Health, Austin, Texas.

NOVEMBER 8.—ATLANTIC CITY, N. J.
Governmental Research Association. Annual meeting. Secretary-Treasurer, Robert M. Paige, Drexel Avenue and 58th Street, Chicago, Ill.

NOVEMBER 9-11.—ATLANTIC CITY, N. J.
National Association of Civic Secretaries. Annual convention. Secretary, Miss H. Marie Dermitt, Hotel William Penn, Pittsburgh, Pa.

NOVEMBER 9-11.—ATLANTIC CITY, N. J.
National Municipal League. Annual convention. Acting Secretary, Howard P. Jones, 309 East 34th Street, New York.

NOVEMBER 16-18.—AMES, IOWA. (100)
Iowa Sewage Treatment Conference, Iowa Wastes and Disposal Association. Joint meeting. Secretary-Treasurer, Lindon J. Murphy, Iowa State College, Ames, Iowa.

DECEMBER 7-8.—WASHINGTON, D. C. (200)
Highway Research Board of the National Research Council. Annual meeting. Director, Roy W. Crum, B and 21st Streets, Washington, D. C.

Portion of Wesley Lake, between Asbury Park, N. J., and Ocean Grove, showing Bethlehem (Lackawanna) Piling Bulkheads. Fred McDowell, contractor.

"Rebuilding" a Lake with Bethlehem (Lackawanna) Piling

IMPROVEMENTS completed at Wesley Lake, between Asbury Park, N. J., and Ocean Grove, offer an interesting example of the use of Bethlehem (Lackawanna) Piling.

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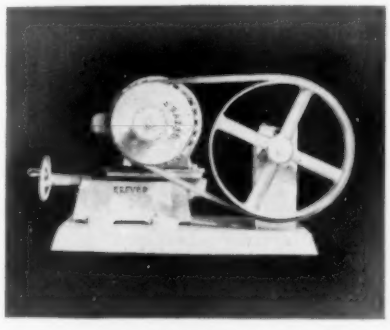
Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Variable Speed Control of Chemical Pumps

Shaler Township, near Pittsburgh, Pa., purchases its drinking water from its larger neighbor. The water flows by gravity from the Lamphier reservoir to a centrifugal pump which delivers the water through 7 miles of main into standpipes serving Shaler Township. As this water comes from the reservoir, it varies considerably from day to day in pH value. Since it is desired to maintain the water in an alkaline condition above 7.0, the pH is raised from 6.6 to 7.4, by treating the water with sodium hydroxide, commonly known as caustic soda, in solution. This is introduced into the water by a small No. 1¼ Type XA pump manufactured by the Northern Pump Co., of Minneapolis, Minn. The pump delivers the solution into the suction side of the centrifugal pump from two small tanks in which the soda is dissolved. The solution is pumped to the suction side of the centrifugal pump against 15 pounds pressure.



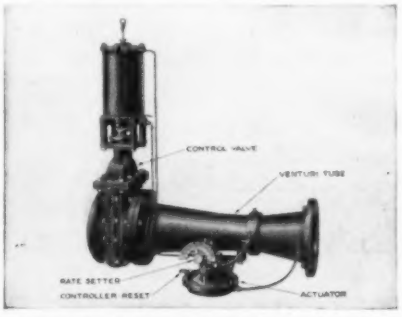
THE CAUSTIC SODA PUMP WITH ITS VARIABLE SPEED MOTOR PULLEY

Since the acidity of the water pumped from Pittsburgh varies, the amounts of sodium hydroxide must be correspondingly regulated. This is accomplished by means of a No. 20 Reeves Vari-Speed motor pulley made by the Reeves Pulley Co., Columbus, Ind., which varies the rate of flow of the sodium hydroxide solution from 0.06 grams per minute to 0.18 grams per minute, operating the pump at speeds of from 300 to 900 rpm. The Reeves pulley is driven from a 1/3-hp, 1,750 rpm, constant speed motor and drives to a 10-inch pulley on the pump.

The installation was made by F. B. Leopold Co., Inc., Pittsburgh, Pa., filtration engineers. The entire unit is very compact and is well adapted to its purpose.

Jeffrey Appoints New Sanitary Engineer

The Jeffrey Manufacturing Co., Columbus, Ohio, has announced the appointment of S. Leland Tolman to the engineering staff of its Sanitary Division. Mr. Tolman has had considerable experience in this field, having served with the Sanitary Corps, U. S. A., after which he was associated with the Sanitary District of Chicago and with The J. N. Chester Engineers, of Pittsburgh, Pa.



THE INFILCO TYPE CD RATE OF FLOW CONTROLLER

A New Rate of Flow Controller

A rate of flow controller designed for any water-works and industrial plant requirements or for the automatic maintenance of a uniform rate of flow of a fluid, is either desirable or necessary for the efficient operation of a plant. A new controller has been designed by the International Filter Co., 59 East Van Buren Street, Chicago, Ill. The maintenance of a constant differential across the actuator diaphragm at equilibrium position, no matter at what rate the controller is set, is the operation principle from which the International Filter Co.'s Type CD rate of flow controller takes its name. This principle permits placing all the actual controlling elements inside the actuator casing and eliminates stuffing boxes, pivoted levers and movable counterweights from both the line of automatic control and released power.

The operating rates for the Infilco controller are changed simply by turning a knob and moving a pointer to the rate indicated on a calibrated rate setting dial. The controllers are provided with a reset to automatically close the control valve when flow through the line is shut off. Thus, when flow begins, the controller regulates "up to" rather than "down to" and the set rate, and the normal operating rate cannot be exceeded even momentarily while the shut-off valve is being opened.

The Type CD wash-water controller is equipped with a patented automatic feature that regulates the movement and position of the control valve when a wash-water valve is closed. The control gate or vanes are automatically brought to a point of closure somewhat under the normal open position and are held there by the operating mechanism and the valve stop until the wash-water valve is fully opened. This device automatically prevents waste as well as dangerous wash rates in filter plant operation.

There is but one adjustment to make at any time after the installation of the CD controller, namely, adjustment for the zero or equilibrium position of the diaphragm and the control pilot. Positive adjustment can be made with a wrench and a screw-driver by any one in a few minutes. Loss of head through the standard controllers is but a fraction of a foot at normal flow. These controllers are shipped completely assembled, and installation consists merely of setting the controller in the line and making pressure and waste connections to the control pilot. Copies of the 16-page illustrated Bulletin 67 describing the constant differential type rate of flow controllers may be secured direct from the International Filter Co.

New Nuchar Branch Office in Columbus, Ohio

The Industrial Chemical Sales Co., Inc., 230 Park Avenue, New York, manufacturers of Nuchar activated carbons for the control of taste and odors in public water supplies, has opened a branch office at 370 West Broad Street, Columbus, Ohio. Richard N. Statham, formerly Assistant Manager in the Chicago office, will be in charge.

Frank T. Sheets Becomes Consulting Engineer of Portland Cement Association

Frank T. Sheets, who until last January was State Highway Engineer for Illinois and has directed that state's 11,000-mile hard-road program, has been appointed Consulting Engineer of the Portland Cement Association, 33 West Grand Avenue, Chicago, Ill. Mr. Sheets entered highway service in Illinois in 1907 and served continuously until last January, except for time spent as a student in the University of Illinois. In 1921 he was appointed Superintendent of Highways, and in 1924 he also became Chief Highway Engineer and thereafter served in a dual capacity. In 1924, he established what is believed to be an unbroken record in pavement construction, when 1,230 miles of concrete were laid.

Howell Becomes Sales Manager for New Diesel Engine

The American Diesel Engine Co., Oakland, Calif., has announced the appointment of J. H. Howell as sales and advertising manager in charge of the marketing of a new diesel engine designed for use in trucks, as well as for marine and agricultural uses. Mr. Howell, since 1926, has been with the general sales staff of the Caterpillar Tractor Co., previous to that being assistant sales manager of that company's western division.

Ransome 13-E Paver on Full-Length Crawling Traction, Boom and Bucket

Ransome 13-E PAVER—

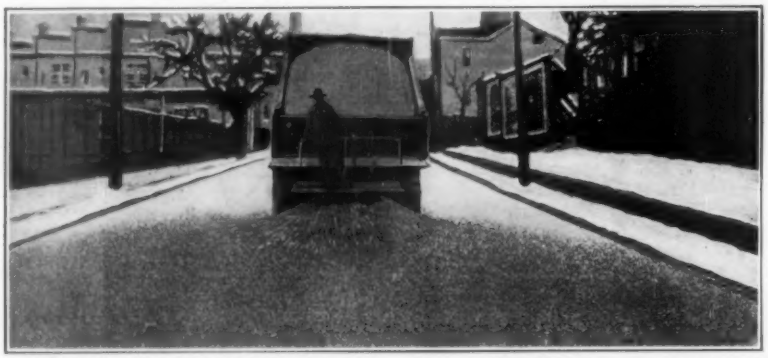
AN IDEAL MACHINE FOR COUNTY, CITY AND BOROUGH WORK

In connection with the work municipal engineers are doing under the Public Works Program with their own forces, they will find the Ransome 13-E Paver an ideal machine. It is especially adapted for paving residential streets, alleys, etc., and for concrete sewers. It can be fed by small trucks or by wheelbarrows. While it is usually equipped with full-length crawlers, it can be furnished on rubber-tired wheels.

Send for Bulletin

Ransome Concrete Machinery Company

Dunellen 1850—Service for 83 Years—1933 **New Jersey**



"HVASS" SPREADERS

Conquer Slippery Pavements

Spread full width street or road at one time or any part thereof.

—SPREAD—
SAND, ASHES OR CINDERS

Can be quickly attached or detached.

Write for descriptive bulletin.

CHAS. HVASS & CO., Inc. 508 East 19th Street, New York City

Carey Elastite EXPANSION JOINT

makes *Good* Paving *Better*

The "sandwich" joint which protects concrete paving against expansion and contraction stresses. Proved by 20 years' use in highways and sidewalks in all parts of the world. Large stocks in principal cities insure immediate shipment. Write for catalog and 1933 prices.

THE PHILIP CAREY COMPANY

Department E-1 **Lockland, Cincinnati, Ohio**

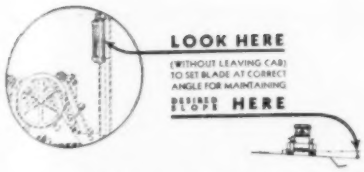
Branches in Principal Cities

Just think... a modern, new hotel, in the heart of New York—200 feet from Broadway, on 45th Street. A room and bath for one, $2.50; for two, $3.50.

It's the **PICCADILLY**

45th STREET and BROADWAY • NEW YORK

WILLIAM MADLUNG, Mng. Dir.



SCHEME OF OPERATING A GRADER WITH A TELL-TALE

Grading Maintenance Made More Accurate

A new tell-tale signal which shows whenever the blade of a maintenance grader departs from the proper cutting position has been developed by the Austin-Western Road Machinery Co., 400 North Michigan Avenue, Chicago, Ill. This new Austin Grade-Ometer makes possible the setting of the blade to cut and constantly maintain a flat or sloping surface as easily as a motorist governs the speed of his car. It is particularly adaptable for use on shoulder, subgrade, oil-mix and retread work and for securing accurate grades when maintaining dirt or gravel roads.

The principle on which the Austin Grade-Ometer operates is simple. In the cab there is a calibrated gage or indicator, equipped with a U-shaped glass tube; the tube is partly filled with a red, temperature-resisting fluid and only one-half of the tube is exposed to view. On the blade-supporting circle, a similar U-shaped arrangement is installed. Two small reservoirs filled with a temperature-resisting fluid are connected to each other at the bottom by a small air-tight pipe. Both the indicator in the cab, and the reservoirs, mounted in the circle, are connected to each other by two air-filled pipes. When the circle and the blade are in level position, the indicator registers zero. When the heel or toe of the blade is raised or lowered, the liquid flows from the bottom of one reservoir into the other, raising the column of air in one pipe line and lowering the column of air in the other. This unbalanced air condition is transmitted to the indicator, causing the liquid within the glass tube to rise or fall. The Grade-Ometer gage is calibrated on one side in degrees and on the other in inches per foot.

Soil Concrete for Low-Cost Roads

Perhaps most promising in the field of highway engineering is the development of improved low-cost roads involving stabilization of road-bed materials. Recent and marked advances in soil science not only reveal the causes of failure of our common naural soil roads, but give us new means to develop what can most aptly be termed "soil concrete." Soil concrete is an intimate mixture of natural soil in graded proportions to attain maximum density and stability. A highway surface of balanced soil composition sets up as an extremely tough and solid mat. Its texture is of such nature that it becomes a network of tiny pores which take up capillary moisture from the subgrade to keep it uniformly damp and compact.

Every one is familiar with the phenomena at Daytona Beach, where for a short period of each day the sand attains a tremendous degree of compaction or stability, permitting enormous racing cars to speed over them at tremendous speeds. This action is wholly due to the tightening of the moisture films about each grain of sand as the water-level lowers and gives the effect of tightly compressing the particles. The same principle makes it possible for controlled moisture to exert similar compacting effect on the tinier particles making up a stabilized soil mortar. Unfortunately, the capillary pores are inadequate to supply the necessary soil moisture to furnish this film cohesion as fast as wind and sun will rob it from the soil. By the use of calcium chloride, however, which has a great affinity for water, the most favorable moisture ratio can be built up and maintained.

Calcium chloride when applied to a table road surface performs two important functions. It acts as a primer to attract moisture to fill the capillary pores, and also sets up a surface tension or vapor pressure, preventing the soil moisture from dissipating into the air.

A consideration of the nature or make-up of a stable soil mat reveals its further analogy to concrete in that it must not be scraped or bladed except after rains when it is wet, nor would you attempt to trowel a mortar when it is dry or set-up. To scrape such a road is not only unnecessary, but harmful, in that it cuts off the surface moisture film and permits the soil pores to bleed out. As soon as the moisture bond is lost, the soil mass disintegrates under traffic, and the balance of soil fines so carefully proportioned is destroyed. Neither must any loose or floating surface stone be maintained on the highway to grind under traffic and break up the surface texture seal. Calcium chloride has been used for many years in surface treatment of thousands of miles of traffic-bound roads, but the discoveries in soil stabilization have not only revealed the extremely important part it plays in developing moisture film cohesion and stability, but clearly point out the factors which, properly controlled, can add immeasurably to its value as a road-building material.

The member producers of the Calcium Chloride Association are prepared to render laboratory and technical service in the analysis of local soils, to determine their proper proportioning for maximum stability, and otherwise cooperate in the field to help highway officials to build soil concrete roads at low cost. The Calcium Chloride Association, 4200 Penobscot Building, Detroit, Mich., is composed of the Columbia Alkali Corporation, Barberton, Ohio; The Dow Chemical Co., Midland, Mich.; The Michigan Alkali Co., 10 East 40th Street, New York; and the Solvay Corporation, 61 Broadway, New York.

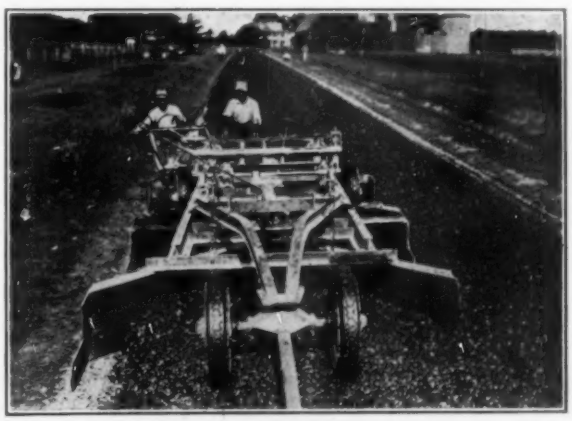
A New Machine for Bituminous Road-Mix Work

A new and improved machine for bituminous road-mix work, known as the Adams retread paver No. 2, has recently been announced by the J. D. Adams Co., Indianapolis, Ind. This machine has a larger capacity than previous models and has a distinctly new feature in the steerable rear truck.

Equipped with three sets of mixing blades and a rear leveling blade, the machine mixes the aggregate four times in one trip. The accompanying illustration shows it mixing crushed stone and cut-back asphalt, the loose stone being bulked 3 inches deep. The aggregate received two shots of bituminous material. A thorough mix was obtained after the first shot with three round trips of the paver, and after the second shot, only three round trips were necessary, including the finishing round.

The paver has an independently controlled rear leveling blade controlled by the man at the rear and center of the machine. This blade may be set to spread the material to the exact width, depth and crown, and the finishing round leaves the material smooth and ready for rolling. The operator at the side of the machine raises and lowers the mixing blades and steers the rear wheels, which pivot like automobile wheels. The purpose of this steerable rear truck is to enable the operator to hold to a straight edge on the finishing round so that any off-line driving by the tractor operator is not reflected in the finished job.

The machine is claimed to work equally well in stone, gravel and slag and with any bituminous material. The quick mix which it is designed to accomplish not only speeds up work and lowers mixing costs but is particularly adaptable for work with bitumen, which sets up rapidly because the mixing is completed while the bitumen is still in its most liquid state. The machine will complete a mile of road per day.



THE ADAMS RETREAD PAVER NO. 2

CHEVROLET

leads the field

by the widest margin in its history

CHEVROLET, *AMERICA'S* NUMBER 1 CAR—47.99%* of all low-priced cars sold

NUMBER 2 CAR—26.74%*

NUMBER 3 CAR—19.21%*

ALL OTHERS 6.06%*

*Based on the latest retail registration figures from R. L. Polk & Company (all states for five full months). Since January first Chevrolet has sold in excess of 370,000 passenger cars and trucks.

CHEVROLET People have come to expect Chevrolet to lead the world in automobile sales. But this year, Chevrolet has done even more than that. According to the latest available figures, Chevrolet alone has sold almost as many cars this year as all the rest of the low-price field combined!

When a car looms above its field like that, there can't be any argument about it. *It must be an all-round better buy.* And that's exactly what Chevrolet offers you. *Fisher bodies,* with the new ventilation system and the strongest and quietest body construction of the day—solid steel over a sturdy hardwood frame.* *A valve-in-head six engine,* unapproached for economy . . . Cushion-Balanced to blot out vibration . . . full of snap and vigor—altogether, the most efficient engine in the low-price field.

Then there's Syncro-Mesh with Silent Second, the Starterator, Simplified Free Wheeling, the Octane Selector, long, parallel-mounted springs—more advancements than we have space to describe. And Chevrolet prices are as low as $445. Don't guess—buy from the leader. Get a car that has been proved sound and dependable by more owners than any other automobile you can buy.

CHEVROLET MOTOR CO., DETROIT, MICH.

All prices f. o. b. Flint, Mich. Special equipment extra. Low delivered prices and easy G.M.A.C. terms. A General Motors Value.

*Steel alone is not enough.

THE AUSTIN MOTOR SWEEPER AT THE WORLD'S FAIR, 1933, IN CHICAGO

Sweeping the Streets of A Century of Progress Exposition

Shortly after the opening of A Century of Progress Exposition in Chicago, it became apparent that means must be provided for cleaning the many miles of asphalt walks and drives daily, in order to keep them presentable. An Austin motor pick-up sweeper, made by the Austin-Western Road Machinery Co., 400 North Michigan Avenue, Chicago, Ill., was put on the job about June 1 and has since been in daily operation. "Daily" is perhaps not quite the way to describe it, inasmuch as the sweeper starts work about midnight and has to finish before the gates open at 9 A.M.

The machine travels about 15 miles each night and picks up an amazing collection of miscellaneous articles in addition to the usual dust and dirt. This collection is not to be wondered at in view of the daily attendance, which is steadily increasing and is now averaging well over 100,000. This motor pick-up sweeper effectively disposed of a problem which, at the start, was causing the officials of A Century of Progress Exposition considerable concern.

Sectional Plate Pipe for Drainage

Sectional Plates so fabricated that they may be readily assembled into various cross-sectional shapes such as ovals, circles and arches, and applicable to drainage construction under many varied conditions, has been developed by the Toncan Culvert Manufacturers Association, Republic Building, Youngstown, Ohio. Toncan Sectional Plate is made of Toncan copper molybdenum iron plate furnished in standard corrugated sections or plates in gages running from No. 7 to No. 1, and so designed that all plates of like dimensions are interchangeable during the erection process. They are punched along the longitudinal edges to receive $\frac{5}{8}$-inch diameter bolts in the crest and valley of each corrugation, the holes being staggered in rows 2 inches apart. The corrugations are 6 inches from crest to crest and are $1\frac{1}{2}$ inches deep.

Each plate is corrugated, punched and curved before being galvanized by the hot dip method, where a coat of 3 to 5 ounces of prime western spelter is applied to each square foot of double exposed surface, a 3-ounce coating being guaranteed.

The plates are furnished in nominal lengths of 5, $7\frac{1}{2}$ and 10 feet and when properly staggered permit the erection of continuous structures without continuous circumferential or peripheral seams. Irrespective of gage number, or of the cross-sectional shape of the structure in which they are to be used, standard corrugated plates, when erected, lap a minimum of $4\frac{3}{4}$ inches in the longitudinal seams, and 4 inches in the staggered peripheral or circumferential seams, of a culvert. Because of this, heavier gage plates may be used in the bottom than in the remainder of a pipe if desired.

All standard plates are of the same width, and when a plate is lapped along both longitudinal edges of adjoining plates it will form 47.12 inches of the circumference or perimeter of any structure in which it is used. The galvanized bolts have a combination head and washer forged to fit the valley of a corrugation, and the hex nut supplied is the regular $\frac{5}{8}$-inch American standard. Bolts are furnished in two lengths, optional with respect to the gage of the plates, one being for two, the other for three thicknesses of metal.

Toncan sectional pipe is shipped in a knocked-down condition. The plates are nested, and the bolts and nuts are packed in kegs or boxes plainly marked as to their contents.

FINISHING A LENGTH OF 90-INCH DIAMETER TONCAN SECTIONAL PLATE PIPE

Proportioneers Move Office to Rhode Island

Proportioneers, Inc., formerly of Chicago, Ill., has moved its main office to 8 Codding Street, Providence, R. I., having been incorporated as a Rhode Island corporation, with Jeff Corydon as President, R. P. Lowe, Vice-President, and H. Chafee, Treasurer. The Chicago office at 737 North Michigan Avenue, Chicago, Ill., will continue to render service in the Mid-Western territory, with E. A. Goodnow and C. A. Beckman in charge.

Public Works Conference

The Fourteenth Annual Conference of the International Association of Public Works Officials will be held at the Hotel Schroeder, Milwaukee, Wis., on September 21 to 23, 1933. A wide variety of topics will be discussed, including the planning of future public works and the Federal public works program.

HOW Three Great Cities Found Street Lighting a Civic Necessity

DORCHESTER PEOPLE ASK STREET LIGHTS
Protest Economy Measure
Plan City-Wide Meeting
RAP SAVING ON STREET LIGHTS
Civic Organizations Plan Special Meeting
STREET LIGHTS TO SHINE AGAIN
2400 Ordered Restored to Service by Mayor
MANY LIGHTS OUT IRK EAST BOSTON

BOSTON'S EXPERIENCE

Early this summer, Boston turned out 2400 of its street lights as an economy measure. Protests began to pour in. Business men, home owners, and housewives objected to the curtailed lighting. Meetings were held, and formal protests sent to the mayor and City Council. As a result, all of Boston's street lights are again shining brightly.

DETROIT'S EXPERIENCE

Last year, Detroit reduced its street lighting by approximately one-third. At the end of ten months, night traffic fatalities had increased 23.3% over those for the same period in the year before, although daytime traffic fatalities had decreased 22%. During the period of curtailment, street crimes and burglaries also increased. Merchants complained that the dim lighting gave the city a "depression" atmosphere. The street lights were restored to full brilliance.

SAN FRANCISCO'S EXPERIENCE

The year before San Francisco's Bay Shore Boulevard was adequately lighted, there were 50 day accidents and 93 night accidents. The year after it was adequately lighted, there were 49 day accidents, but only 54 night accidents — a decrease of 42 per cent, attributable to street lighting.

Scientifically designed glassware is absolutely essential to obtain for your community the greatest possible protection through its street lighting. Gleason-Tiebout glassware is designed to meet the specifications of General Electric street-lighting engineers. These engineers will gladly assist you in planning a comprehensive street-lighting program which will fulfill your needs intelligently and economically.

GLEASON-TIEBOUT GLASS COMPANY

99 COMMERCIAL STREET, BROOKLYN, N. Y.

GT-24

Outdoor Lighting

A Section of *The American City*
Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

The Illumination of Interburban Arteries

By DUDLEY M. DIGGS
General Electric Company, Schenectady, N. Y.

HEAVILY traveled arteries outside city limits are fraught with hazards at night, not only for automobilists, but also for drivers of all other vehicles, and for pedestrians. The safety of these highways by night as well as by day should be of great concern to state and county officials.

The cities also are affected because rural highways are becoming one of the major means of transportation between cities, for carrying pleasure cars, business cars, busses and trucks; because rural highways are more and more becoming the routes over which flows the trade between city and country; because, in many instances, cities are the largest taxpayers within the county, and therefore deeply interested in the safety of the surrounding highways as well as the city streets. All the hazards of the highway, such as curves, embankments, and ditches, are increased in the darkness of night. What this means in lives, injuries, and dollars is of great importance. Accident data are accurately maintained by many states. New York State conservatively records only those accidents that cause death or injury. During the twelve months ending July 1, 1933, the New York State Motor Vehicle Department made a survey of pedestrian accidents on the rural highways of the state, which shows the relation between accidents and the time of their occurrence.

Night and Day Traffic and Accidents Compared

Three conditions affect traffic fatalities —traffic, weather, and light.

During the three winter months traffic is 30 per cent less than during the three summer months.* Night traffic in winter is an even smaller proportion of night summer traffic. Nothwithstanding the great reduction in night driving during the winter months, the night fatal accidents were more than twice as many as during the summer months. The day fatalities during the winter months showed exactly the opposite trend, proving conclusively that the night-time increase in fatalities was due to inadequate illumination. Analyzing the survey data by months shows even more clearly the relation of darkness to the number of fatal accidents.

In order to arrive at the relation between fatal accidents and light conditions, it is necessary to eliminate traffic and weather conditions. This can be done by obtaining the percentage of night fatal accidents to total accidents, since weather and traffic affect both day and night accidents alike. It is then necessary to obtain the percentage of night hours to total hours. These two percentage figures can then be compared on an equitable basis in order to obtain the true relation between darkness and the number of fatalities.

Month	Per Cent Night (Including Dusk) Hours of Total†	Per Cent Night Fatalities of Total
December	62	72.8
November	61	84.7
January	61	84.3
October	54	73.4
February	56	75.0
September	48	52.3
March	50	61.7

It will be noted from the table that the percentage of hours of darkness (including dusk) in November and January is the same, and the percentage of night accidents for these two months is also identical. In October and February there is the same close ratio applying between hours of darkness and night accidents. September and March show the same trend as the other months, with an even greater proportion of night accidents.

Accident Reduction by Better Lighting of Rural Highways

Comparative data on the Schenectady-Troy and Schenectady-Albany highways, which are now lighted, have been secured through a study which covered a period of four years—two years before the highway lighting was installed, and two years since. They show that:

Day accidents have *increased* 13.1 per cent; night accidents have *decreased* 40.0 per cent.

Since the road conditions remained the same over this period, the lighting must have been an important element in the great proportionate reduction of night accidents, inasmuch as the day accidents showed an increase.

The percentage decrease in night accidents for these Schenectady highways so closely parallels the case of the Bay Shore Boulevard, San Francisco, across the continent and under varying local conditions, that it indicates we are approaching a fundamental.

Inasmuch as the rural highway accidents have been increasing at a more rapid rate than the city accidents, we will examine the over-all figures. The New York State statistics are available and will serve as an example:

Year 1927	
Day accidents	41,502
Night accidents	29,724
Day fatal accidents	1,159
Night fatal accidents	918

Year 1932	
Day accidents	49,712
Night accidents	38,473
Day fatal accidents	1,262
Night fatal accidents	1,381

This shows an increase in *day fatal* accidents of approximately 11 per cent, whereas the increase in *night fatal* accidents is over 50 per cent.

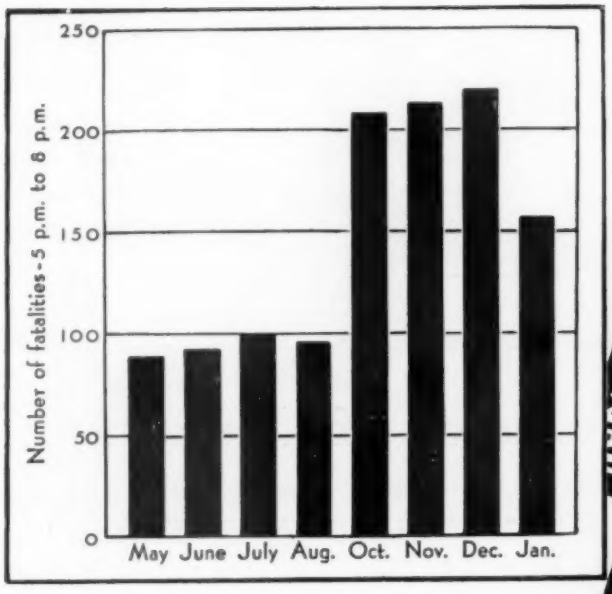
It is estimated by the National Safety Council that at least 35 per cent‡ of night accidents are due to insufficient or

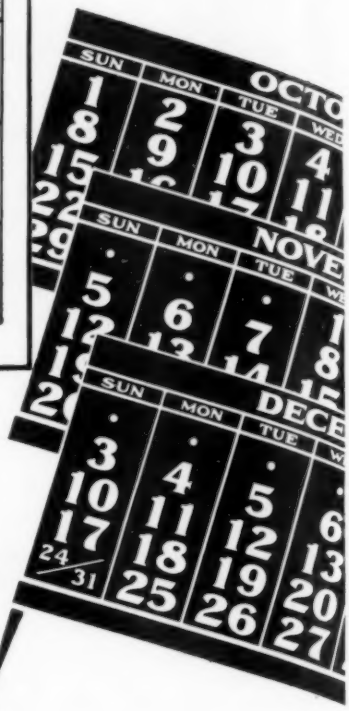
* This is based directly on the New York State gasoline consumption, which is a very accurate gage of traffic.

† The figures on hours of darkness are based on data from the United States Weather Bureau at Albany.

‡ This is the lowest figure of the three most authoritative surveys.

The Travelers Insurance Company conducted a survey in 46 large cities showing that between 5 and 8 p.m. twice as many accidents occur in October, November, and December as during preceding summer months.





PREPARE FOR THE ACCIDENT MONTHS

—*Improve your street lighting NOW*

Dust-proof Luxsolite Pendant.

Paragon street lighting Luminaire.

DIMMED street lights, broken globes and burned-out lamps take their heaviest toll of traffic accidents in the fall and winter months . . . when night falls early and traffic increases.

Statistics show that in normal years twice as many evening accidents occur during October, November and December as during preceding summer months. Because of present curtailments of already inadequate street lighting, accident totals will probably reach even higher peaks this fall and winter.

Adequate street lighting is your most effective means of combatting this annual accident peak.

Make a careful survey of your street lighting system now. Restore all lights that budget curtailments may have forced you to eliminate, and replace all broken globes and burned-out lamps.

You'll find that effective street lighting pays for itself in reduced accidents, crime prevention, enhanced property values and increased business.

Westinghouse is the only manufacturer who supplies a *complete* line of street lighting equipment. Whether you are installing a new lighting system or repairing the old, you'll find it most satisfactory to get all of your equipment from one reliable source.

T 79672

Westinghouse

Quality workmanship guarantees every Westinghouse product

When you write for that catalog, kindly mention THE AMERICAN CITY.

improper illumination. Nearly one-half of these night accidents occur on the rural highways. On the basis of collected statistics, each automobile accident results in an average economic loss of approximately $3,000. Night accidents would be well above the average, so that we would be most conservative in using this figure. The total economic loss can readily be calculated. The following gives this loss for New York State during the year 1932.

Accidents which occurred after dark	38,473
Number of accidents after dark on highways, due to inadequate and insufficient illumination (estimated)..	6,730
Total economic loss, state of New York, for the year 1932, due to accidents caused by inadequate and improper illumination of highways...	$20,190,000

Other Advantages of Highway Lighting

1. Highway lighting minimizes headlight glare, making it possible to drive with lowered or depressed beams; reveals the presence of pedestrians and other objects in the vehicle's path; illuminates the sides of the road, and in other ways greatly increases safety.

2. It shows holes and obstacles in the roadway which otherwise are at least partially obscured and noticed only as shadows on irregular road surfaces; in light well directed from above, these irregularities are shown in their correct perspective.

3. It gives additional comfort in night driving, which also makes for quicker physical reaction.

4. Highway lighting spreads traffic more equally over the 24 hours. There is an incentive to do more trucking at night; repairs can be made more easily, tires changed, etc. Night speeds can be safely increased; commercial and salesmen's automobiles can use the road more at night; often saving a few hours may mean an entire day in delivering and unloading merchandise.

Some Recent Installations

One of the most notable of the recent highway lighting installations in New Jersey is that of Route No. 25 between Jersey City and Newark, consisting of 6,000-lumen lamps mounted at a height of 23 feet and spaced approximately 150 feet apart in a staggered arrangement. This has already led to several other installations in the state, including Morristown and Asbury Park. A state-wide survey has been started with the idea of decreasing night accidents at intersections by means of highway lighting.

In New York State many recent installations have been made, including the Grand Central Parkway from Flushing, L. I., to Jones Beach. This entire distance is lighted by 775 ornamental luminaires equipped with B-symmetric refractors, and 300-watt lamps. The Sunrise Highway on Long Island, near Rockville Centre, has also been illuminated with 6,000- and 10,000-lumen lamps mounted in ornamental Novalux luminaires. Schenectady County has installed more than 30 miles of highway lighting in the past few years. This lighting, which has gradually grown from a 1-mile test strip, consists of lamps mounted at a height of 23 feet and spaced 250 feet apart in a staggered arrangement.

The Lynn Shore Drive in Massachusetts, as well as Fairfield Avenue, approaching Bridgeport, Conn., and a part of the Post Road running from New York to Boston, are recent installations.

In the vicinity of Detroit alone there are installed over 200 miles of highway lighting, using 6,000-lumen lamps. Early in 1933 the new causeway leading into Muskegon, Mich., was illuminated with 6,000-lumen lamps.

There are many typical installations on the West Coast.

The rapid increase of the fatalities during the hours of darkness and the decrease of these fatalities with adequate illumination more than justifies the lighting of our main arterial highways.

EDITORIAL NOTE.—This supplements the article on "Adequate Street Illumination Decreases Crime and Accidents," by the same author, to appear in The Municipal Index for 1933.

Increased Street Illumination Secured by the City of St. Paul

By CHARLES PATTERSON

THE city of St. Paul, Minn., has approximately 10,000 electric light units and owns and operates its street-lighting system. The attention of the city officials was called to the increased illumination afforded to city streets by the use of the Welsbach-Silvray processed lamp in re-directing to the street the useless rays emitted from the lamp to the upper zones, and street tests were made to determine the amount of added light and the longevity of the lamp. It was found that the illumination of the surface to be lighted was increased from 50 to 75 per cent, and the life of the lamp was not impaired by the processing. The City Council therefore adopted the lamp as a measure of efficiency and economy and awarded a contract for the maintenance of its street-lighting system with this equipment to the American Development Co., a subsidiary of the Welsbach Street Illuminating Co., and an associate company of the Welsbach Street Lighting Co. of America, which, after exhaustive laboratory and street tests, had developed the processed lamp.

Among the other large municipalities that are using this means of increasing street illumination is Norristown, Pa., a community of 40,000, which is the largest borough government in the United States.

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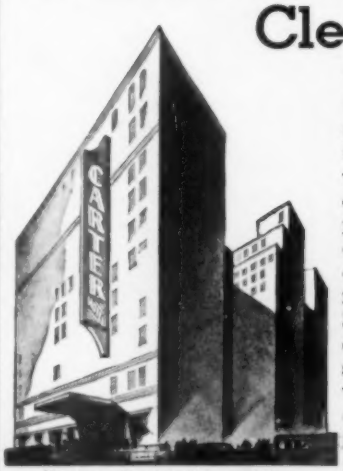

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President Roosevelt to the Mayors of America

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—From a telegram to the United States Conference of Mayors, September 22, 1933.

Secretary Ickes to the Mayors of America

"It is now largely in the hands of the mayors of our cities to determine whether the Public Works Program will fully serve its purpose in aiding in the economic recovery of the country. Our National Treasury is waiting to be drawn upon for hundreds of millions of dollars for useful public works. . . . We can give you money; we can help you decide what project to undertake; we can assist you with your plans and your specifications and the letting of your contracts; we can aid you in supervising your work; we can meet the charges of the contractors when they fall due; we can even encourage you to speed up your projects. But we cannot do more than this. We cannot decide for you whether you want public works. We cannot make you borrow money from us on favorable terms. We cannot force you to move any faster than you are willing to move."

—From an address at the United States Conference of Mayors, at Chicago, September 23. (See page 5 of this issue.)

The Mayors of America to the Public Works Administration

"The United States Conference of Mayors are in full accord with the policy of providing every safeguard to prevent waste, inefficiency or corruption in connection with the expenditure by the Federal Government of $3,300,000,000 and an amount twice as great by the cities and towns of the nation. We are fearful that, in our anxiety to prevent the evils which have been ever present in connection with the expenditure of public money, the system of checks and balances and safeguards devised is so intricate and involved, or, in other words, so enmeshed in red tape, as to defeat the very purpose for which the NRA was created, namely, to end unemployment in America."

—From a resolution adopted at the above-mentioned convention.

The Federal Emergency Administration of Public Works has responded by announcing (September 25) that loans and grants to municipalities will be expedited by employment of double shifts for both day and night work at the Washington headquarters.

Will the mayors also respond by speeding up the submission of new applications for sound, well-planned public works projects, whose prompt construction would reduce unemployment and add to the permanent assets of the cities and villages of America?

For activities and rulings of the Federal Emergency Administration of Public Works, see pages 5, 11, 45, 46, 48, 58, and 65 of this issue.